

MERCURY'S BIG, NEW OUTBOARD ENGINES <sup>p78</sup>

# BOATING

WORLD'S LARGEST POWERBOAT MAGAZINE

## SMARTPHONE VERSUS GPS

CAN TECHNOLOGY UNSEAT THE REIGNING  
KING OF MARINE NAVIGATION? <sup>p94</sup>

### CERTIFIED BOAT TESTS

MONTEREY 360SC

GRADY-WHITE EXPRESS 330

CHAPARRAL 307 SSX

SEAVEE 270Z BAY

PREMIER 241 CAST A WAY

SCARAB 165 HO IMPULSE

MONTEREY  
360SC  
IT'S A WHOLE  
NEW WORLD

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GREAT BOATS  
FOR LESS THAN \$20K <sup>p72</sup>

MARINE ELECTRONICS GOES  
WIRELESS WITH NAVICO GOFREE <sup>p90</sup>



HOW TO USE  
A BUFFER <sup>p48</sup>





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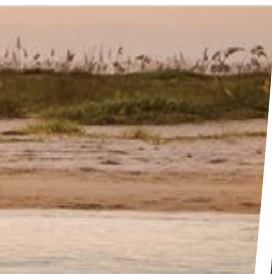
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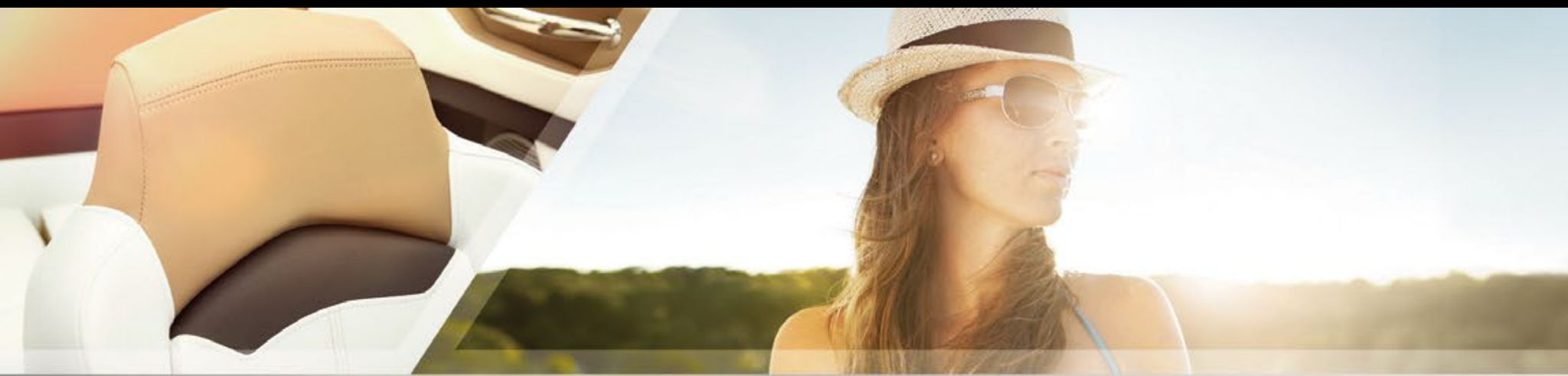


#### ◀ ON THE COVER

The Monterey 360SC adds a little luxury to your day. Photo: Forest Johnson

PHOTOS: (CLOCKWISE FROM TOP LEFT) BILL DOSTER, COURTESY INTERSTATE BATTERIES, BILL DOSTER (HANDS), COURTESY GRADY-WHITE, FOREST JOHNSON





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# Editorial

By Kevin Falvey



## Time Flies

CONSUMERISM AND THE ART OF BOAT MAINTENANCE

**O**N THE ONE HAND, I AM SORRY to say that the years are starting to roll by faster and faster for me. On the other hand, a good thing about that fact is that it now seems like spring rolls around sooner than ever. Instead of an interminably long pause from boating, winter has become sort of like a commercial break — a time to catch a snack, maybe hustle out the trash, and then get back to the regular programming.

In fact, upon reflection, I think winter's rapid passing may not be age related at all. Instead, it's probably a result of my decades-long habit of using "tarp time" to catch up on projects and purchases necessary for the health and welfare of *Breakaway*.

This year, I need a new battery. That's no big deal. In fact, it's hardly worth mentioning but for the fact that the pair of absorbed glass mat batteries that anchor my boat's 12-volt system were installed 10 years ago as a test for *Boating*. Ubiquitous now, AGMs were new on the scene in 2004. They promised greater power density, a lower self-discharge rate and more resistance to vibration and shock. In fact, for every "ailment" afflicting conventional flooded electrolyte batteries one could name, AGMs were said to have been immune.

So I put them to the test by calling them out on their claims. I left them in the boat during the annual four-month winter haul-out. I did not charge them. All I did was check the battery hold-down brackets and inspect the terminals for signs of corrosion.

And each spring, the engine would fire right off. No problem. I'd run accessories for hours. No problem. These batteries performed in this abusive service — I should have at least cleaned them and fully charged

them prior to the annual winter layup — year after year after year.

In fact, they lasted for 10 years despite being totally abused in the name of testing. That sold me on the AGM technology, and it more than made up for the increase in purchase price versus conventional marine batteries. The AGMs may have cost more, but they were not expensive, since I had rarely gotten more than three reliable years out of a boat battery before making the switch.

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◀ **Instead of an interminably long pause from boating,** winter has become sort of like a commercial break — a time to catch a snack, maybe hustle out the trash, and then get back to the regular programming.

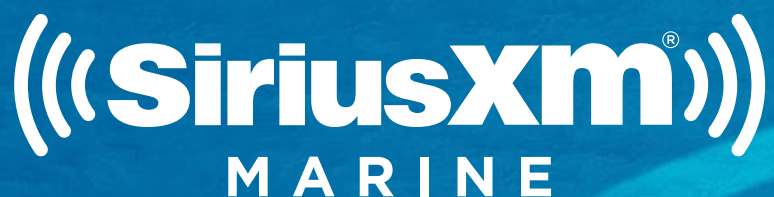
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Early in the fall of 2014, I began to notice that one of my batteries was taking longer to recharge, and after returning from a few weeks on the road during which my boat sat idle, it had discharged quite a bit. Sulfation and age and purposeful neglect had finally taken a toll. So I procured and installed a new pair of AGM batteries over the winter, just like I did in 2004.

From this experience, I can say with all assurance that AGM marine batteries are one accessory for which the upcharge in price is worth paying. Winters are too short to be changing batteries every few years.

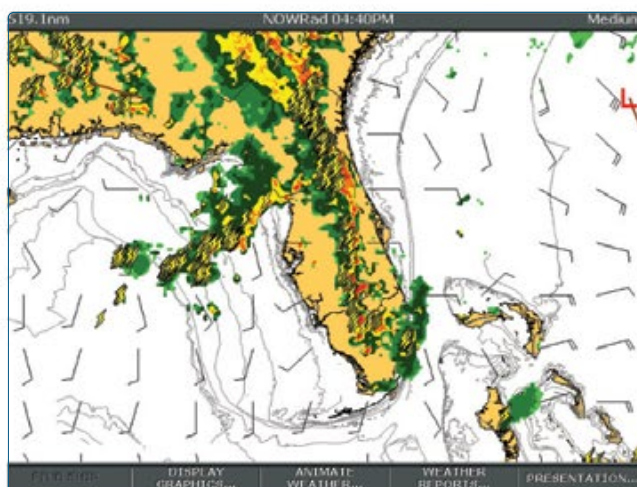
Kevin Falvey, Editor-in-Chief  
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# Making Waves

ON BOARD WITH ...

## Ron Chrastina

### Pride of America Captain

Has docking ever been a challenge for you? Imagine trying to dock *Pride of America*, the massive, 921-foot-long, 80,000-plus-gross-ton cruise ship from Norwegian Cruise Line. As captain of the ship, Ron Chrastina does it practically every day with more than 2,000 passengers on board. We asked him what it's like. — Joe Friedman



To read the full interview online, tap here or go to [boatingmag.com/pride-of-america](http://boatingmag.com/pride-of-america).



electricity that runs the two forward-facing props mounted on 360-degree rotatable Rolls-Royce Mermaid pods. They also send power to any or all of the three bow thrusters when needed. Since the pods can rotate through a complete circle at slow speeds, I can use them for forward and aft propulsion and/or as a stern-thruster. I generally enter the harbor channel at around 5 knots, which is enough to give me positive steerage to get around bends and turns. Once we're making the final approach to our berth, I engage the thrusters and usually only one of the pods to slide onto the pier.

#### Sounds simple. Do you ever have any problems?

Sure. We're a big ship and that means we can occasionally have big concerns. That's why I keep a tug handy, but for the most part we don't require its assistance. I can stop the *America* from 3 knots to dead in the water in less than a ship length. We have our own onboard computer-driven simulator with complete command and control graphics for all of the harbors we visit, so we can stay sharp and practice in a variety of weather conditions without risking any real-world damage.

#### Is shoving off just as easy?

Pretty much. Normally I try to just push off parallel to the pier using one of the pods and the thrusters. Sometimes the wind conditions will dictate that we should move either the bow or stern off first and then, once we're clear, either power forward or, if the stern is off first, back out to clear water and turn to the harbor entrance.

#### Sounds like no big deal to you.

I don't mean to make it seem that way, but after working the simulator for hours and then actually docking and leaving a couple of hundred times, it does become kind of routine. I can assure you, though, with all our experience, we are never overconfident. I know that "stuff" happens, and I am constantly watching out and trying to anticipate the possibilities just like any captain, no matter how large or small his vessel is, can and should be doing.

#### Bringing the *America* in to port must be quite a challenge, wouldn't you say?

Well, it's really just a matter of scale. I use all the same principles any captain would use. Tide state, current and wind are the big variables. Being 12 stories above the water gives me great visibility, but the downside to that is windage, and that can be a serious concern — big winds can be big trouble.

#### You must have quite a bit of help doing the maneuvers.

Although we have more than 900 crew members, only a handful are actually involved in handling the ship. The rest tend to hotel-like duties, designed for the passengers' comfort. My navigation team consists of the officer of the watch and junior officer of the watch, a lookout, my staff captain (second in command) and my chief officer (just

for good measure) — and I do have a tug standing by in case I need a push or nudge. Mostly, though, it's experience with a large dose of anticipation of prevailing conditions.

#### OK, so how do you maneuver?

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## Deck Boots

Not all boaters wear deck shoes or flip-flops. Some don deck boots. This is particularly true of boating anglers in cooler climes where keeping your feet

dry is important. Yet so is comfort. To help you decide which water-proof deck boots are most comfy, we compared four brands all in size 11 (the

author's size), each in the course of a winter's day on the boat. Our subjective comfort rating is on a 10-point scale, 10 being best. — *Jim Hendricks*



### **Bogs** *Highliner Pro Tall Lite*

**MATERIAL:** Flexible rubber with foam lining

**HIGH RISE:** 16 inches (can be rolled down)

**OUTSOLE:** Slip-resistant, nonmar-ring black rubber with quarter-inch-deep chevron-tread pattern. Three-eighths-inch heel.

**INSOLE:** High-density contoured EVA foam

**MOISTURE/ODOR PROTECTION:** 2 mm EverDry with DuraFresh

**COLOR(S):** Dark green only, which could get hot on a sunny day.

**WEIGHT:** 2.6 pounds per boot (heaviest of the group)

**COMFORT RATING:** 8

**COMMENTS:** A bit tight, especially if you have wide feet or high arches. If you wear thick socks, step up a size.

**PRICE:** \$134.95; shoebuy.com



### **Rugged Shark** *Great White Deck Boots*

**MATERIAL:** Flexible rubber with felt lining

**MEDIUM RISE:** 11 inches (can be rolled down)

**OUTSOLE:** Slip-resistant nonmar-ring tan rubber with mini grooves to channel away water. Quarter-inch heel.

**INSOLE:** Shock-absorbing, con-toured foam foot pad.

**MOISTURE/ODOR PROTECTION:** Removable foot pad lets you air out the insole after a long day on the water.

**COLOR(S):** Black or white, the preferred color for warm climates

**WEIGHT:** 1.95 pounds per boot

**COMFORT RATING:** 9

**COMMENTS:** Plenty of room for heavy socks. They live up to their rugged name.

**PRICE:** \$69.99; basspro.com



### **Shimano** *Evair Deck Boots*

**MATERIAL:** Flexible polymer reminiscent of Crocs

**LOW RISE:** 7 inches (can't be rolled down)

**OUTSOLE:** Slip-resistant nonmar-ring tan rubber with mini grooves to channel away water. Quarter-inch heel.

**INSOLE:** Shock-absorbing con-toured foam foot pad

**MOISTURE/ODOR PROTECTION:** None

**COLOR(S):** Gray or tan, both good colors for warm climates

**WEIGHT:** 0.8 pound per boot (lightest of the group)

**COMFORT RATING:** 8

**COMMENTS:** These run on the large side but offer plenty of room for heavy socks. Great for boaters with wide feet or high arches.

**PRICE:** \$74.99; tackledirect.com



### **Xtratuf** *Performance Deck Boots*

**MATERIAL:** Neoprene upper with flexible rubber below, lined with neoprene

**HIGH RISE:** 12 inches (can be rolled down)

**OUTSOLE:** Slip-resistant nonmar-ring blue rubber with one-eighth-inch trade pattern. No heel.

**INSOLE:** Shock-absorbing con-toured foam pad

**MOISTURE/ODOR PROTECTION:** Removable foot pad lets you air out the insole between trips.

**COLOR(S):** Dark blue or black/gray upper

**WEIGHT:** 1.57 pounds per boot

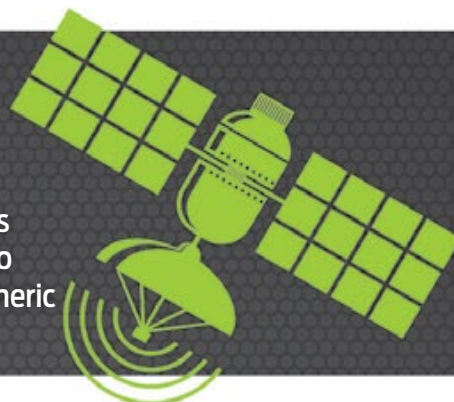
**COMFORT RATING:** 8

**COMMENTS:** These new-generation Xtratuf deck boots run on the small side, so step up a size or two.

**PRICE:** \$99.99; xtratufboots.com

# 112

People rescued on U.S. waters through distress signals via emergency position-indicating radio beacon (EPIRB) to National Oceanic and Atmospheric Administration (NOAA) satellites



# 37,000

Worldwide rescues in NOAA's SARSAT (search-and-rescue satellite aided tracking) program since it started in 1982



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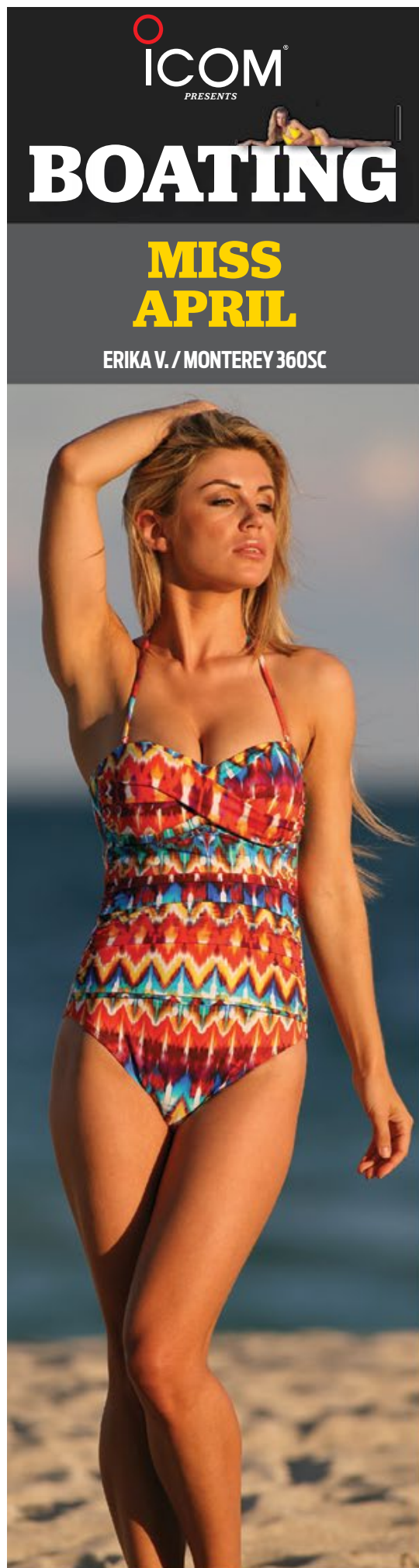


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## Making Waves

### Captain's Test

#### Bottom Paints

Boating season is just around the corner, and it's time to get your pride and joy ready. One of the biggest pre-season prep chores is bottom painting. Let's see if you should be getting your roller pan ready or writing the check for the yard to do the work. — *Eric Colby*  
(Answers on p. 24)

1 You need anti-fouling paint only in salt water.

- A. True
- B. False

2 Different areas of the country have different bottom-growth issues. If you have issues with slime where you boat, what ingredient do you need to look for in your anti-fouling paint?

- A. Irgarol
- B. Biolux
- C. Neither A nor B
- D. Either A or B

3 Your boat has sterndrives and you want to paint them as well.

- Why shouldn't you use a paint containing cuprous oxide?
- A. It creates galvanic corrosion.
- B. It won't stick to the metal.
- C. It reacts with the paint on the drive and removes it.
- D. It clogs the water passages on the drives and overheats the engine.

4 You want your anti-fouling paint to last multiple seasons. You applied a copolymer ablative paint at the start of last year.

What do you need to do to activate it in 2015?

- A. Power-wash the bottom
- B. Sand the bottom
- C. Wax the bottom
- D. All of the above

5 Your boat has a brightly colored hull and you want bright anti-fouling paint. What ingredient do you need in your paint?

- A. Copper thiocyanate
- B. Zinc
- C. Ecomea
- D. All of the above

## Four on the Floor?



If you're a fan of the ancient cartoon series *Jonny Quest*, you might recall the clip of Jonny, Dr. Benton Quest, Hadji and Roger "Race" Bannon cruising above a river in their hydrofoil speedboat. This brings up two questions: "How do I get a nickname like 'Race'?" and "Where is my personal hydrofoil?" The latter question has finally been answered, at least partially. For \$28,000, you can buy a two-place Quadrofoil ([quadrofoil.com](http://quadrofoil.com)), a 9.8-foot, 220-pound, composite-hull, electric-powered boat with a 62-mile range and a top speed of 25 mph. According to the Slovenian manufacturer, it's

unsinkable. Of course it does have two life vests on board, so maybe it's not *that* unsinkable.

While a hydrofoil's ride is smooth and fast, it costs an arm and a leg to build and a small fortune to maintain, which, notwithstanding *Jonny Quest's* dad — Dr. Quest has a Batmanesque fortune — pretty much confines it to hauling lots of passengers across smooth bodies of water. (In fact, the Quadrofoil is limited to swells less than 1.6 feet high.) But, jeez, the Quadrofoil looks cool: like the Empire's speeder bikes from *Star Wars* or, of course, *Jonny Quest's*. Want one? — *Phil Scott*

PHOTO: COURTESY QUADROFOIL



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# Alaska Gone Wild

Is there anything sexy about a crab boat? Maybe one that's now operating as a strip club. *Wild Alaskan* opened for business off Anchorage, Alaska, last June, and its first days were smooth,

profitable and without incident.

After three days in business, though, the government discovered shocking — shocking! — problems: The water taxi hauling patrons to and from *Wild Alaskan* was reportedly overloaded. Once owner Darren Byler presented a document to the U.S. Coast Guard showing that the taxi is legally permitted to carry up to six passengers and four crew, he was allowed to resume business. Then Coast Guard inspectors discovered the old crabber had an expired personal location beacon, expired inflatable devices on two life rafts and inoperable navigation sidelights. Once

Byler rented new equipment, the Coast Guard reopened the water taxi.

However, Alaska's Alcoholic Beverage Control Board then revoked the liquor license, namely because the boat was anchored, while the license, a common carrier license, requires a vessel to be *moving* passengers. But all wild things must learn to adapt to changing environments. While *Wild Alaskan* shut down over the long northern winter, Byler says it will be (occasionally) pulling anchor and cruising this spring. And hopefully no one will be using it to catch crabs. — P.S.



## ► Captain's Test

(ANSWERS FROM P. 22)

- 1 B. Slime and zebra mussels are just some of the organisms that can attach to your boat's bottom in fresh water.
- 2 D. They block photosynthesis near the water's surface, slowing slime growth.
- 3 A.
- 4 B. Light sanding reactivates the protective ingredients in the paint.
- 5 D.

PHOTO: SHUTTERSTOCK

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*by Dougherty*

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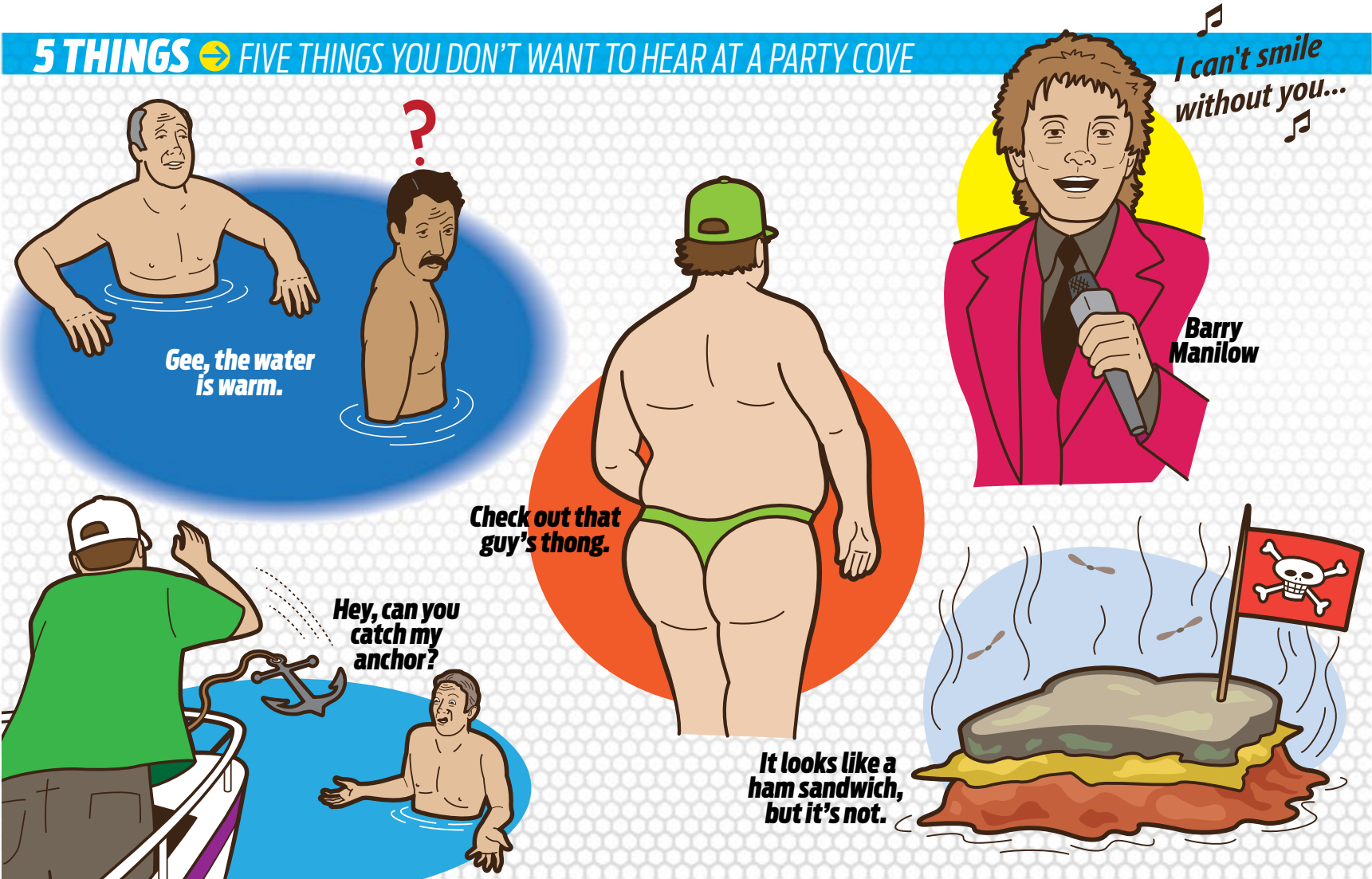
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## Making Waves

# Online This Month

If you're getting ready for the upcoming season, it's time to think about a few things you need to do for your boat. **1** Don't forget about your boat's propeller. Follow the propeller inspection checklist at [boatingmag.com/propeller-inspection-checklist](http://boatingmag.com/propeller-inspection-checklist). **2** Don't have time to run to the ships' store? Check out the 31 household items we recommend to help maintain your boat at [boatingmag.com/tricks-trade](http://boatingmag.com/tricks-trade). **3** There are plenty of ways to prep your fiberglass boat, but do you know how to prep your pontoon boat? Find out at [boatingmag.com/prep-pontoon](http://boatingmag.com/prep-pontoon).



ILLUSTRATION: TIM BARKER; PHOTOS: BILL DOSTER

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# Seamanship

By Kevin Falvey



## Lateral Thinking

BUOY, OH BUOY, CAN IT MAKE SOME BOATERS CRAZY.

**I**N TALKING WITH BOATERS, BE THEY READERS, MARINA MATES or folks I meet on the water, it's become apparent that some are baffled by buoys. The crux of the problem, as I've discerned it, is the supposition that nav aids tell loads of detailed information — that they are supposed to be interpreted, only after long experience, like hoodoo chicken bones, a racing form or a conversation with a woman in late-stage pregnancy.

In fact, nav aids give very simple information. The first buoys in the United States were casks, placed in the Delaware River in 1767 to mark shoals. They weren't color-coded, lit or equipped with sound signals. In fact, casks and spars were used until the 1860s, when standardized sizes and colors and, subsequently, our present-day lateral system were

rock, the color change over a ledge, the wading birds. ...

We can look at things the same way the old river men did. You see a red light flashing out of the gloom of night. Count: *One, one thousand, two, one thousand, three* and blink. That's a light with a 2.5-second flash. Now look at the chart, paper or digital, and find the aid that matches that characteristic. Simple. If you know where you are, then you're not lost. It's a tiny bit of information but a very big deal on a black night with a blow coming on.

*Red, right, return* — the cutesy method of remembering the lateral system — also trips up a lot of boaters I've spoken with. I think that while repeating that mantra, they are trying to ascertain if it also means *green, right, depart*, which it does, but while their brain is engaged with that, they run up on the ledge. And of course there are many coastal stretches where "seaward" is an arbitrary direction.

Instead of port and starboard, left and right, try using basic directions (or that spinning thing with 360 little marks on it mounted in front of your wheel). You should most always be on the same side of the buoy, regardless of the direction you are going. If a green can mark the northern



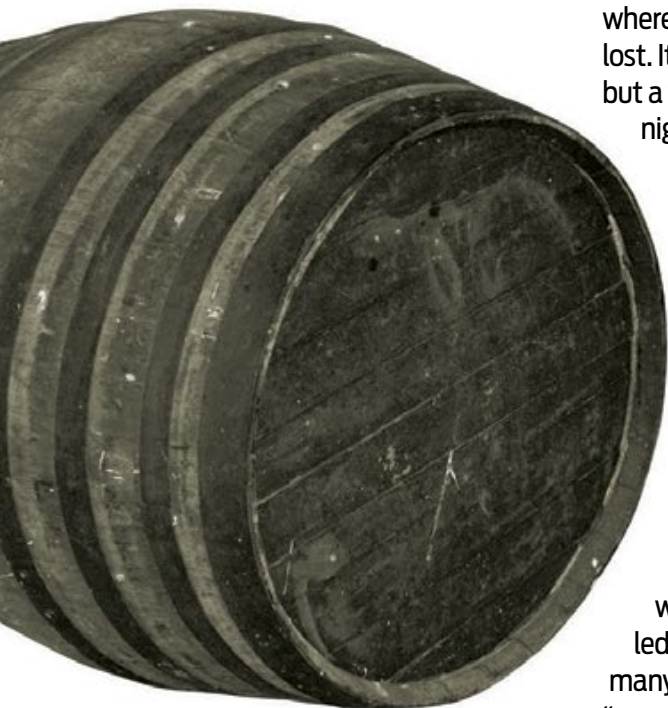
edge of a channel when heading east, then guess what? It still marks the northern edge of that channel when you return heading west. Instead of juggling colors, lateral positions and nominal directions, just remember that most nav aids mark the edges of channels, the limit of water that has been sounded as safe. You are always on the same side of same-color markers. Most helpful is to study the chart before starting your cruise and get a mental picture of

the underwater topography. You don't have to remember the number and color of every marker. Simply write, "Pass north of all greens"

or "Keep east of all reds until inlet" in grease pencil (which wipes off easily) on your windshield. That way you don't have to remember aphorisms, slogans and Sea Tow's phone number. All you have to do is head at the marks, slowly and directly. If in doubt, mind your sounder and keep an eye out for ripples, color changes and wading birds.

### QUICK TIP

**All red aids to navigation (ATONs) are conical or triangular, while all green ATONs are conical or square.**



emplaced. Before that, every port had different shapes, sizes and colors of buoys and markers. *Those* required interpretation. They simply told boatmen that something was there to be avoided. It was up to the skipper to see the ruffle over an awash



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# The Boat Doctor

## Q&A

By Michael “Mick” Hannock



**ASK THE MASSES** Go to [boatingmag.com/forums](http://boatingmag.com/forums) to ask fellow boaters your questions, or to answer theirs.

### What Happened, Mick?

[ Q ] There was an error in your reply under “Juice Maker” (January). You stated that watts = amps ÷ volts. The correct equation is watts = amps x volts.

**KENNETH R. KOENITZER**

*White Haven, Pennsylvania*

[ A ] I regret allowing that error to get by me, sir. Thank you for pointing it out.

### Build-a-Cabin

[ Q ] We became regular readers after seeing Heather Steinberger’s story about boat camping [September 2014, “Mountain Time”]. We are avid boat campers, and toward that end, we recently acquired a 21-foot RIB. We love it for its speed, soft ride, carrying capacity, shallow draft and light trailering weight. We have been camping from it — stowing a tent aboard that we pitch ashore and sleep in for the night.

However, there are spots we’d like to camp in which there is no shoreline access. The addition of an enclosure made of fabric with some clear plastic panels would be ideal. Can the sort of folding-frame “camper top” seen aboard small sterndrive cruisers be made for a RIB?

**DOTTIE AND JIM BEDNARZ**

*Springfield, Massachusetts*

[ A ] I have seen such an enclosure once or twice on a RIB and a few more times on conventional-hull center-console boats, so I am confident in stating that a good canvas top fabricator could make you an enclosure to suit. My guess is, since you lack the full windshield of a small cruiser, that a large fabric and plastic panel, or panels, will form the front of your enclosure. This likely means that you will have to motor at reduced speed with the enclosure erect; however, much depends on the final design. Go seek out the best canvas guy you can find and pin him down.



Check your boat’s fuel system annually for safety. Make sure hoses are firm and exhibiting no cracks or delamination and that clamps are well secured. Make sure that O-rings on fuel fill caps are in good shape so as to keep water out — these can be replaced easily. Check tank fittings and gaskets for leaks. Look for tank leaks, and if there is any doubt about the tank’s integrity, pressure-test the tank or replace it.  
— *Kevin Falvey*

### Top Redux

[ Q ] Some of the zippers for my Pursuit boat’s canvas need replacing. Since it’s the dead of winter here in Ontario, I thought to learn a new skill and save some money. Is it feasible to replace my own canvas top zippers? I have access to my wife’s sewing machine.

**PETER OVERSBY**

*Barrie, Ontario, Canada*

[ A ] Snaps and grommets are well within the realm of DIY repair. Zippers are another story. Home sewing machines don’t have the guts to sew marine fabrics, so you’d need to invest in one, and that cost alone would not be worth it unless you had quite a few repairs in mind. One could be sewn by hand, using a sailmaker’s palm and needles, but it would be quite tedious. This is one I think you should send out for repair. For a list of canvas repairs suited to handy DIY boaters, check out the article at [boatingmag.com/diy-canvas-repair-tips](http://boatingmag.com/diy-canvas-repair-tips).

### Slick Question

[ Q ] Dear Boat Doctor, what is your favorite grease or lubricant for use aboard boats?

**JOHN STELLA**

*Atlanta, Georgia*

[ A ] Talk about putting a guy on the spot ... geez! There are many situations in which a lubricant tailored to a particular situation is called for specifically. But if pressed, I would say that Yamalube’s Marine Grease — the blue stuff — is the most versatile grease in my shop. It has shown great resistance to washout, high temperatures and corrosion over a period of many years. I use it in applications as diverse as trailer wheel bearings, steering systems and throttle linkages. I even use it in my fishing reels. There are likely other marine greases just as versatile, no doubt, but since I know how this stuff performs, I continue to use it.



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## The Boat Doctor

### Moor Boating

**[ Q ]** We are moving into a new home that comes with deeded mooring rights. We have always docked our boats, but this move means we will be keeping *Therapy*, our 32-foot Four Winns, on a mooring. There is some time between now and spring here in Maine, and we were hoping you could give us some mooring pointers.

**JAN AND CESAR DUPUIS**

(soon to be) Wiscasset, Maine

**[ A ]** Good for you. Plenty of boaters construct their own mooring system. The first thing to do is speak with the harbor master, town waterway department or whatever organization regulates the moorings in your area. They will have specifications for things

such as the size and type of anchor or chain required and the buoy type(s) needed, and information on whether you will have to haul the mooring for the winter or leave it in and replace the buoy with a so-called “winter stick.” The components of a mooring are not cheap, though we need not replace them often. Still, it pays to buy once, so make sure yours meet local regulations.

After ascertaining the above, seek out some local boaters. If you don’t know any, try the local United States Coast Guard Auxiliary flotilla or U.S. Power Squadrons branch. Local knowledge as to specifics of the mooring and the local waters, not to mention references for contractors to set your mooring once you’ve built it, will prove invaluable.

### Tiger in the Tank?

**[ Q ]** Why do some engines require high-octane ratings in order to achieve their rated horsepower?

**DAN MISENER**

San Diego, California

**[ A ]** The answer is complex, Dan. High-octane fuel doesn’t pack more energy. Instead, high-octane fuel is more resistant to causing preignition — aka “knock” or detonation. Preignition occurs when fuel ignites before a spark plug fires. It can damage an engine, but truth be told, today’s computer-controlled engines rarely have a problem with damage from knocking. In fact, it’s that very ability to protect against knock that allows certain engines to make more power with higher-octane fuel.

If knock is detected, the onboard diagnostics will take steps to prevent it and protect the engine. The specifics of this protection may vary with the engine and the specific scenario, but in all cases, the protective steps instituted by the electronic control unit will cut efficiency. So using a higher-octane fuel, with its higher resistance to knocking, ensures the engine computer does not engage protective measures that can cut efficiency and, therefore, peak power potential.

### Stable and Able

**[ Q ]** My brother-in-law insists that I should add stabilizer to my tank all the time, not just for periods of long-term storage. Is he correct?

**CINDY HASKELL**

Lewes, Delaware

**[ A ]** I agree with your brother-in-law, Cindy. With an ethanol-blend fuel, adding a stabilizer like Star brite’s Star Tron every time you fill up is a good procedure.

### Covered?

**[ Q ]** Hi, Mick.

For the first time, I will be keeping my boat on a mooring instead of trailering it. (Six years on the town’s waiting list finally came to fruition.) How do I calculate the bottom area of my boat for purposes of purchasing the correct amount of anti-fouling paint? The boat is 24 feet length overall and has an 8-foot-4-inch beam.

**JONATHAN NEWHOUSE**

Salem, Massachusetts

**[ A ]** You are overthinking this. While a naval architect could provide you a method to determine the immersed area at rest, you don’t need that kind of precision to purchase bottom paint. The paint isn’t sold in fine enough increments: It comes in either quarts, gallons or five-gallon pails. So just multiply the length by the beam. That will be a little more than the actual immersed area since most planing boats are shorter at the waterline than on deck, and many are narrower down lower as well. But that’s OK, because you need to apply the paint above the actual waterline and also cover the transom. It will work out fine for you if you buy enough paint to cover 200 square feet per coat; that’s two quarts per coat for most anti-fouling paints.

### ( WE TEST STUFF )

#### Permanon Test: Part 1 (A Boat Wax Substitute)

Permanon is a high-tech coating comprised of nanoparticles of silicium that bonds to paint or gelcoat and provides protection that’s said to last for months.

To find out how it works I applied Permanon to a tow vehicle and a boat. The truck is my own and, in addition to living in a marine environment, has resisted sand and road salt of a Northeast winter at least as well as any wax I have ever used. Of course Permanon applies much easier than wax — basically, you just spray and wipe. It took me 20 minutes to coat a full-size pickup.

The treated boat will endure the Florida summer sun as well. Come fall, we’ll report on how well Permanon performed.

Permanon Platinum costs from \$26 for 100 ml to \$230 for a liter. It comes in a concentrate form that you mix between 3 and 5 percent with water. For more information, visit [permanonusa.com](http://permanonusa.com). — K.F.







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## The Boat Doctor

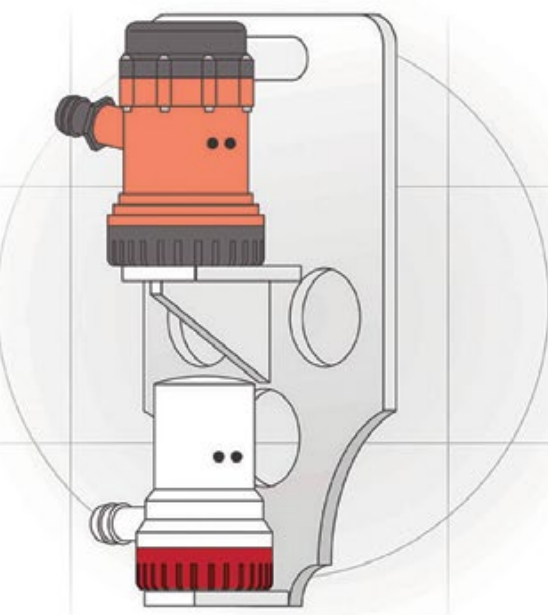
### Bilge Pump Drama

**[ Q ]** My boat gets left at our summer place for weeks on end without attendance. I need a bulletproof bilge pump system for peace of mind. I am very handy and ready to pay for the best components. What type of system do you suggest?

**RAY PORTLAND**

*Montpelier, Vermont*

**[ A ]** There is nothing more “bulletproof” than regular use and inspection. That said, the first thing to do is make sure you have a robust electrical system and as large a battery capacity as possible, perhaps



with solar backup if no shore power is involved in your arrangement. Second, check out this article *Boating* published a few months back that details how to install a great bilge pump system: [boating.mg/bilgepump](http://boating.mg/bilgepump).

### Power Query

**[ Q ]** I just bought a used boat, and the engine is not revving up to the full specification in the owner's manual. I want to change props to ensure the engine is turning maximum rpm. Do I go up in pitch? Or do I go down in pitch? And how much? Thanks.

**EDMUND BURKE**

*Sioux City, Iowa*

**[ A ]** On average, every 1-inch change in prop pitch results in about a 200 rpm engine speed change. More pitch will reduce rpm and less pitch will allow the engine to turn higher rpm. Do make sure your tach is accurate, and ask your dealer if he will lend you a demo prop prior to purchasing one. Many will do so.

### What's the Frequency?

**[ Q ]** I would like to be able to know if my VHF radio is working. How can I be sure it is broadcasting?

**EVERETT VAVRA**

*Greenville, North Carolina*

**[ A ]** You can install a watt meter, like those made by Shakespeare (model ART-3, \$119, [westmarine.com](http://westmarine.com)) in the antenna lead. This will tell you the radio's output. You can also hail fellow boaters or the U.S. Coast Guard and ask for a “radio check” — make sure you ask for the location of those boaters who “come back” to your request, since that will give you an idea of the range you are achieving.

A third alternative is to use the automated “self-serve” radio check system provided by Sea Tow. Here are the steps to use that service:

1. Automated radio check service uses VHF Channel 24, 26, 27 or 28. Simply tune the radio to the proper channel for your community.
2. Conduct a radio check as you normally would.
3. Upon releasing the microphone, the system will replay your transmission, letting you hear how you sound.

### Tab Zinc

**[ Q ]** Should I protect my trim tabs with a zinc?

**JON ALBERT**

*Cutchogue, New York*

**[ A ]** Probably. Many boaters do, and if you keep your boat in the water, I would advise it. Make sure you haven't painted the area under the sacrificial anode. Good “metal-to-metal” contact is required for the conductivity that helps provide the protection.

### No Gas

**[ Q ]** Dear Boat Doc, I am the original owner of a 1976 Chris-Craft 35 Double Cabin. It is powered by twin 235 hp Marine Power Thermocon 350-Q with Carter Model AVS carburetors. I replaced the mechanical fuel pumps with electric fuel pumps and have been having starting problems

when the boat sits for more than a day.

When starting after a day or more of not running, I pump the throttles and a small amount of gas is pumped by the accelerator pumps into the carburetors but the engines will not start. Continuous pumping does not help. If I spray a starting fluid of gas into the carbs, the engines start immediately and will continue to run and start for the rest of the day. What could be wrong?

**DOUGLAS HEINEMAN**

*Charlotte, North Carolina*

**[ A ]** Did you wire in a cutoff/bypass that would cut power to the electric fuel pumps when the engine is not running? This is a U.S. Coast Guard safety requirement intended to prevent fuel from being pumped without the engine running. Typically, these cutoffs are wired through a low-oil-pressure switch so that, when there is no oil pressure (engine off), the fuel pump won't run. In order to start an engine so wired, there is

### ( WE TEST STUFF )

#### Interlux Trilux 33

I keep my boat in a slip, on the northeast Atlantic coast, for eight months per year. Last year, I applied Interlux

Trilux 33 to my outboard's

mounting bracket and trim motor, my trim tabs and my transducers. The 'ducers and tabs got four coats due to the extra washing action those components endure; two coats were applied to the motor. At the end of the year, I had only a very thin layer of slime and grass to remove from the top of my tabs, and some more in the crevices of the outboard bracket. These areas were easily brushed clean. Interlux Trilux 33 works. It comes in gray, black and white. \$32.68; [jamestowndistributors.com](http://jamestowndistributors.com) — K.F.







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## The Boat Doctor

usually a power lead off the starter that powers the fuel pump during initial starting — when the key is in the “crank” position. This bypasses the low-oil-pressure cutoff and fulfills the regs. I would look closely at this circuit if I were you.

### Rags to Richness

**[ Q ]** What is the best type of rag to use for waxing a fiberglass boat — terry cloth, microfiber, or what?

**JOHN BIORDI**

*Severna Park, Maryland*

**[ A ]** I happen to like terry rags for removing wax and a light cotton T-shirt cut into rags for applying wax when I am waxing by hand, which isn't often. I own a number of polishers. However, there are times and places where hand-waxing serves best — for instance, waxing around the gauges and instruments in a helm panel. In fact, you remind me of this great tip: Use white cotton gloves to apply and remove wax in tight spots such as the narrow



NAUTICAL NO-NO

### Clogged Limbers

A limber, or “limber hole,” is a drain hole between compartments or structural elements aboard a boat. Typically, limbers allow water to flow through the stringer grid down to the lowest point in the bilge, where the pump or pumps can evacuate it and prevent flooding or sinking.

Now, over time, limbers can clog, and they should be checked when possible and reamed out. But the limber shown here is doomed to failure from the get-go. It's aboard a brand-new boat, and, as can be seen, the builder did not carefully ream out the hole after drilling it. The breakout on the other side — those loose fibers — is going to ensure that this limber clogs sooner rather than later.

Be sure to check out the limbers aboard the boat you own or any new or used boat you are considering for purchase. — K.F.



strips just above a coaming pad, the border around hatches, and in between gauges and dials. Just use your fingers like custom-fit, articulating applicators.

### Sloshed

**[ Q ]** I have an older express cruiser. While running in choppy waves one day, I noticed some water coming up from a screw hole in the salon sole.

PHOTO: KEVIN FALVEY

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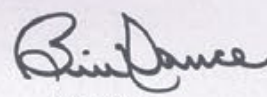
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## The Boat Doctor

(The one screw is missing; it is one of four that secures a bracket.) What can be the matter and what can we do about it?

**BILL AND MAY BODKIN**

*Pittsburgh, Pennsylvania*

**[ A ]** Your boat is built like many others in that it features a complete cabin “pan” or “liner” that isolates the bilge from the cabin. This pan includes the cabin sole and the interior of lockers. This method has some decided advantages, but one disadvantage to using a pan can be access to the bilge when and if needed. And you now need better bilge access than your boat’s construction method will allow.

The water is likely coming from above; perhaps a rail stanchion, cleat or other deck fitting is leaking. These things need to be rebbed over the life of a boat. It could also be that there is a leak in a hose that passes through this compartment. In any event, it appears that the water is collecting where it cannot flow back through limber holes to the bilge pump(s).

I suggest cutting a hole in the pan at 4 or 6 inches in diameter so that, when done, you can cover the hole with a standard deck plate. Use a hole saw chucked in a drill motor.

Through this hole you will suck out the water and look for the obstructed limber hole. You’ll have to do some detective work: tapping, pressing or perhaps utilizing a dentist’s mirror to determine

the best place to cut your hole.

I’d further suggest contacting the manufacturer about this issue. The possibility of making a warranty claim has long passed, but the builder can probably advise you on the best place to seek access.

### Oil Twice?

**[ Q ]** This is my first season with a four-stroke outboard. I changed the oil when I winterized the engine in the fall. Do I have to change the oil again before putting the engine back in service?

**ERIC MULCAHEY**

*Toronto, Ontario, Canada*

**[ A ]** No reason to change the oil again, Eric. Run the engine and change the oil and filter at the next 50 hours of use (or whatever interval your manual specifically suggests).



PHOTO: COURTESY WEST MARINE

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## The Boat Doctor

### Zinc Again

**[ Q ]** My zincs look almost brand-new. Do I have to change them just because it's spring? The place I boat is on the Connecticut River.

**EVAN WEISS**

*Springfield, Massachusetts*

**[ A ]** What kind of "zincs" are you using? Sacrificial anodes may be made from aluminum, magnesium or zinc. In fresh water, zinc can become inactive and lead the uninitiated

boater to think all is well: The reality is that inactive anodes are providing no protection. That is why magnesium is a preferred metal for anodes on freshwater boats.

### Hull Thumper

**[ Q ]** I am in a position to buy a boat from a co-worker. It's a great buy. But how do I know what to look for to make sure it's OK?

**ROD BURLINGAME**

*Via email*

**[ A ]** If you have to ask that question, how do you know it's a good buy? The best advice I can give you is to hire a marine surveyor to inspect the boat for you. Contact either the Society of Accredited Marine Surveyors ([marinesurvey.org](http://marinesurvey.org)) or the National Association of Marine Surveyors ([namsglobal.org](http://namsglobal.org)). The fee charged will be a small price to pay for the ability to make a confident boat-buying decision. In the meantime, for more tips and information, check out our boat-buying channel at [boatingmag.com/how-to-buy-boat](http://boatingmag.com/how-to-buy-boat).

### Cleanup Time

**[ Q ]** Are there any soaps that lather in salt water? I would like to clean the blood and stains off my boat, even if I can't get the salt off. I am at a mooring, and using the dock hose isn't always an option.

**PETER DYSTROM**

*Wellfleet, Massachusetts*

**[ A ]** Soaps will not lather in mineral-laden "hard water" or salt water. But detergents will. What's the difference? Chemically, soap is a metallic salt of a fatty acid from plant or animal matter. Being a salt is why it doesn't dissolve well in salt water. A detergent is a synthetic product containing sulfonates and aromatics along with surfactants and foaming agents. So check the labels – or ask the manufacturer.

### Speed Freak

**[ Q ]** Dear Doc, what is the number one way to add speed to my boat?

**JOHN HIGGINS**

*Atlanta, Georgia*

**[ A ]** Remove excess weight. Run with only enough fuel for the day. Leave extra cases of beverages at home. When was the last time you actually needed that mini sledgehammer for an emergency repair? Don't be foolish about what you remove, but trimming the weight is effective — and it's free.

### ASK THE DOCTOR

Send questions with your name and address to: [boatdr@boatingmag.com](mailto:boatdr@boatingmag.com) or The Boat Doctor, *Boating*, 460 N. Orlando Ave., Suite 200, Winter Park, FL 32789.

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**5** Mark your battery with a grease pencil or nail polish to record the date of installation. We also suggest keeping a logbook. The factory date labels don't last in the bilge or engine room environment.

**6** Secure it right: Batteries must be tied down tight. We prefer a box or bracket with threaded rod and nuts to those webbed straps, but anything that meets the American Boat and Yacht Council (ABYC) spec of resisting 75 pounds of force applied is OK.

## Battery Tips

MAINTENANCE FREE? NOT!

**B**OATS DEPEND UPON BATTERIES MORE SO NOW THAN THEY ever did. In addition to their main function as an energy source to turn the starter motor and start the engines, batteries run a host of accessories and onboard appliances. Use these tips to better care for your boat's batteries.

**1** Clean terminals and the case with a paste made from baking soda to neutralize any acid. More than one battery has died because the grease and acid film across the case became conductive and connected the two terminals.

**2** Fill cells of flooded electrolyte ("conventional" batteries) with distilled water if they are empty or low. Tap water may contain minerals that can have a deleterious effect on the internal plates. Distilled water

can be purchased at a pharmacy — or sourced for free from your dehumidifier's condensate collector tray.

**3** Make sure the positive terminal of the battery is covered. The most common way to achieve this is with a "boot" that can be purchased from retailers for a nominal amount. The boot prevents sparks and arcing and possible explosion if, for instance, a tool is dropped on it. This is why we recommend a boot on the



positive terminal even if the battery is in a box with a cover: When you work on the battery, you will remove the cover.

**4** Lightly grease the battery terminal posts. Too much grease is bad because it increases resistance. We recommend a dielectric grease, which is conductive. Some greases are actually insulators. Many pros apply grease only *after* the connections are made.

**7** Swap out wing nuts on the terminals for nyloc nuts. These will not come loose and will ensure a robust connection. Loose connections impair charging, hinder output and increase resistance.

**8** Charge batteries fully to 13.4 volts for flooded electrolyte and 13 volts for absorbed glass mat (AGM) batteries like the Interstate Deep Cycle pictured at top. — Kevin Falvey

**MYTH  
BUSTER**

*It's OK to store a battery on a concrete floor of a garage or basement. Old batteries had rubber cases that could become porous and allow some discharge. Today's battery cases are plastic, so this cannot happen.*





SAVE TODAY. **SMOOTH WATER TOMORROW.**

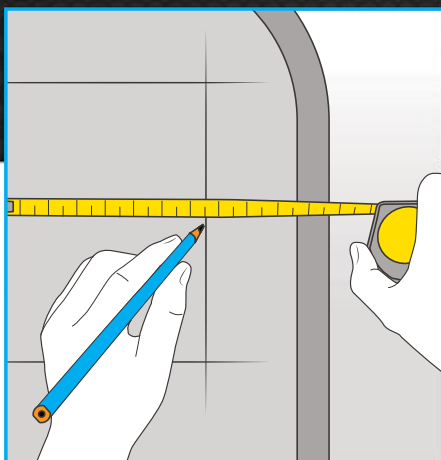
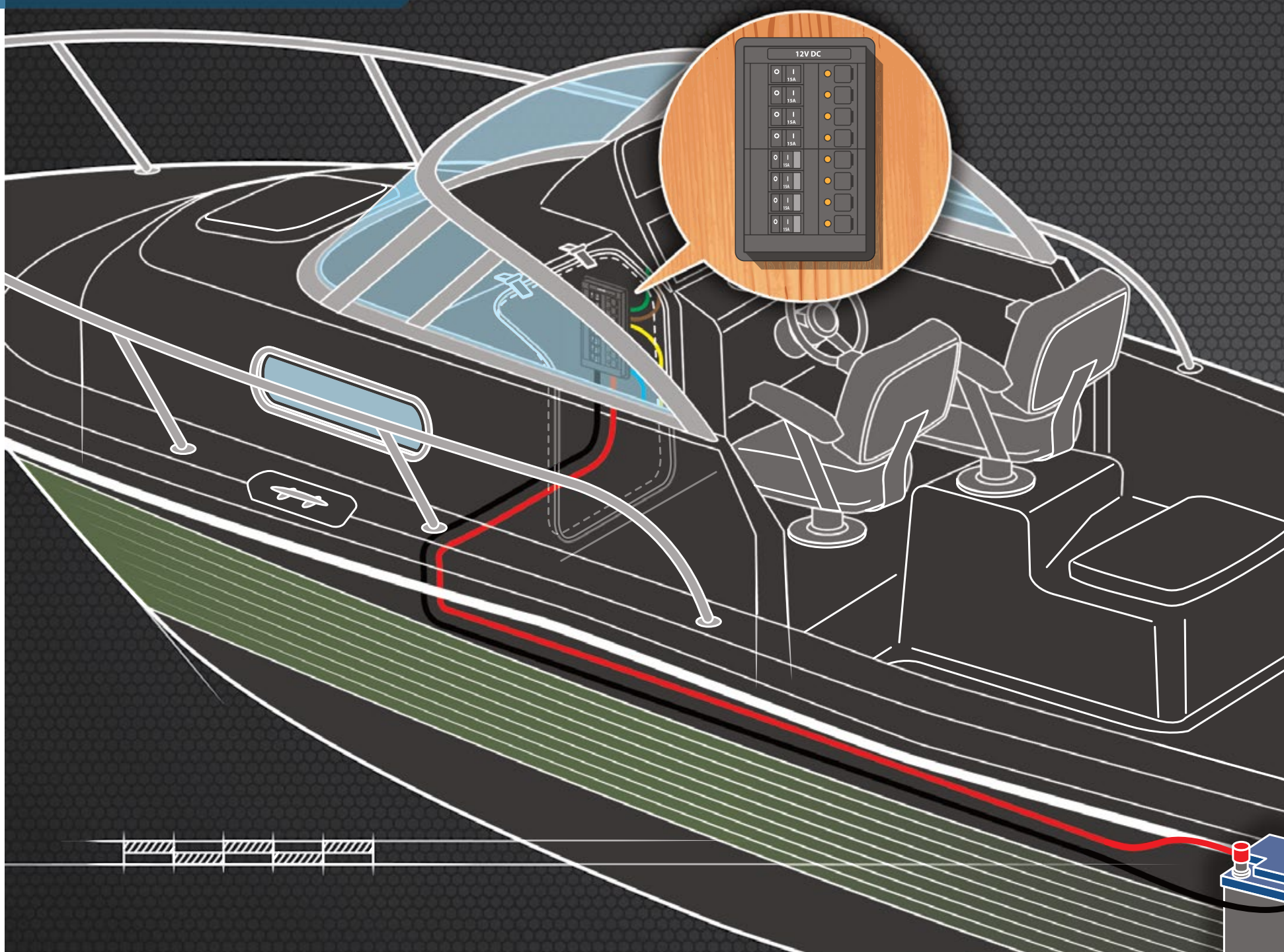
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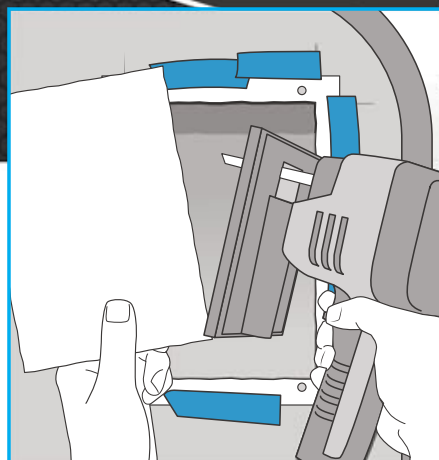




**1 CHOOSE A LOCATION** Since the panel we installed would distribute 12-volt DC power to marine electronics with built-in on/off switches — and because we had limited space at the helm station — we looked for a vertical surface inside the cabin of our walkaround cuddy project boat. We chose a carpeted wooden bulwark behind the helm station spanning 6 inches in width, 9 inches in height and 6 inches in available depth.



**2 SELECT THE PANEL** We picked the Blue Sea Systems 360 Series No. 1200 eight-position panel (4.88 inches wide by 7.75 inches high). Each rocker switch includes a 15-amp breaker (higher amps available), an LED indicator and recesses to prevent inadvertent tripping. Backlighting lets you read the labels at night. An interior installation precludes the need for a waterproof model such as Blue Sea WeatherDeck panels designed for exposed areas.



**3 MAKE THE CUTOUT** Tape the supplied template in position, making sure there's nothing interfering with the 3-inch depth of the panel behind the mounting surface. Start the 4 $\frac{7}{8}$ -inch by 7 $\frac{3}{4}$ -inch cutout by drilling just inside each corner. Then cut along the lines with a jigsaw, taking care not to damage any wires or hoses behind the mounting surface. Also use the template to mark and drill the holes for the mounting screws.

### QUICK TIP

Use Blue Sea Systems' DC Circuit Wizard at [circuitwizard.bluesea.com](http://circuitwizard.bluesea.com) to guide you in suitable wire size and fuse/breaker selection for the main DC feed, as well as branch circuits.



# Adding a Distribution Panel

## UPGRADE YOUR ELECTRICAL SYSTEM WITH A DISTRIBUTION PANEL.

Many boats function nicely with a single-switch panel at the helm to control 12-volt systems. Yet you might need more switches, such as when adding marine electronics. One of the best solutions is adding a distribution panel that routes power from the battery to various components or secondary switch panels. These are available from a number of brands, including BEP Marine, Blue Sea Systems, Paneltronics and Sea-Dog, in a wide range of configurations. Before you start, disconnect all DC and AC power. — *Jim Hendricks*

## GETTING STARTED

### SKILL LEVEL



### TIME TO COMPLETE

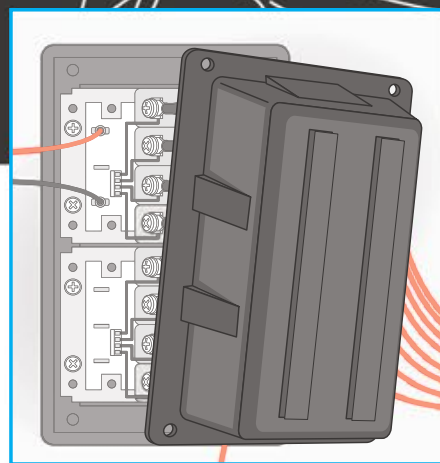
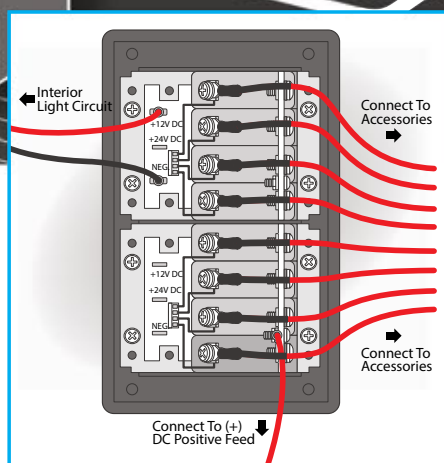
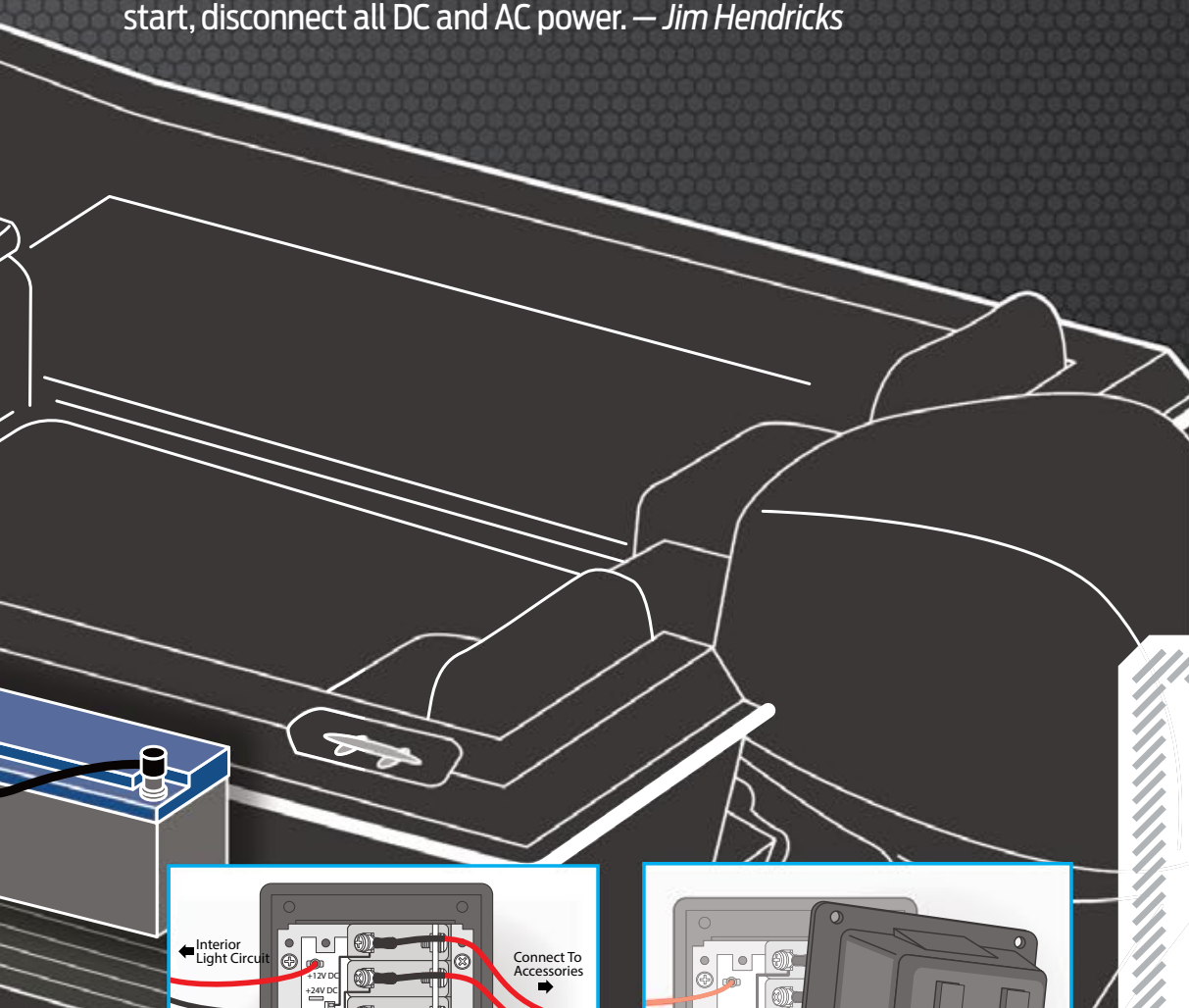
**5 HOURS**

### TOOLS AND SUPPLIES

- ▶ Blue Sea Systems 360 Series No. 1200 eight-position distribution panel (\$219.95; [shop.pkys.com](http://shop.pkys.com))
- ▶ Blue Sea Systems panel back insulation cover, No. 4027 (\$24.99; [overtons.com](http://overtons.com))
- ▶ In-line fuse or circuit breaker for main cable for DC feed
- ▶ Jigsaw
- ▶ Phillips screwdriver
- ▶ Drill motor and bits
- ▶ Masking tape
- ▶ Wire stripper and crimper
- ▶ Marine-grade tinned electrical wire and cable
- ▶ Assorted ring connectors with heat-shrink collars
- ▶ Heat-shrink tubing
- ▶ Electrician's snake (to run main cable and accessory wires)

## WEATHERPROOF PANELS

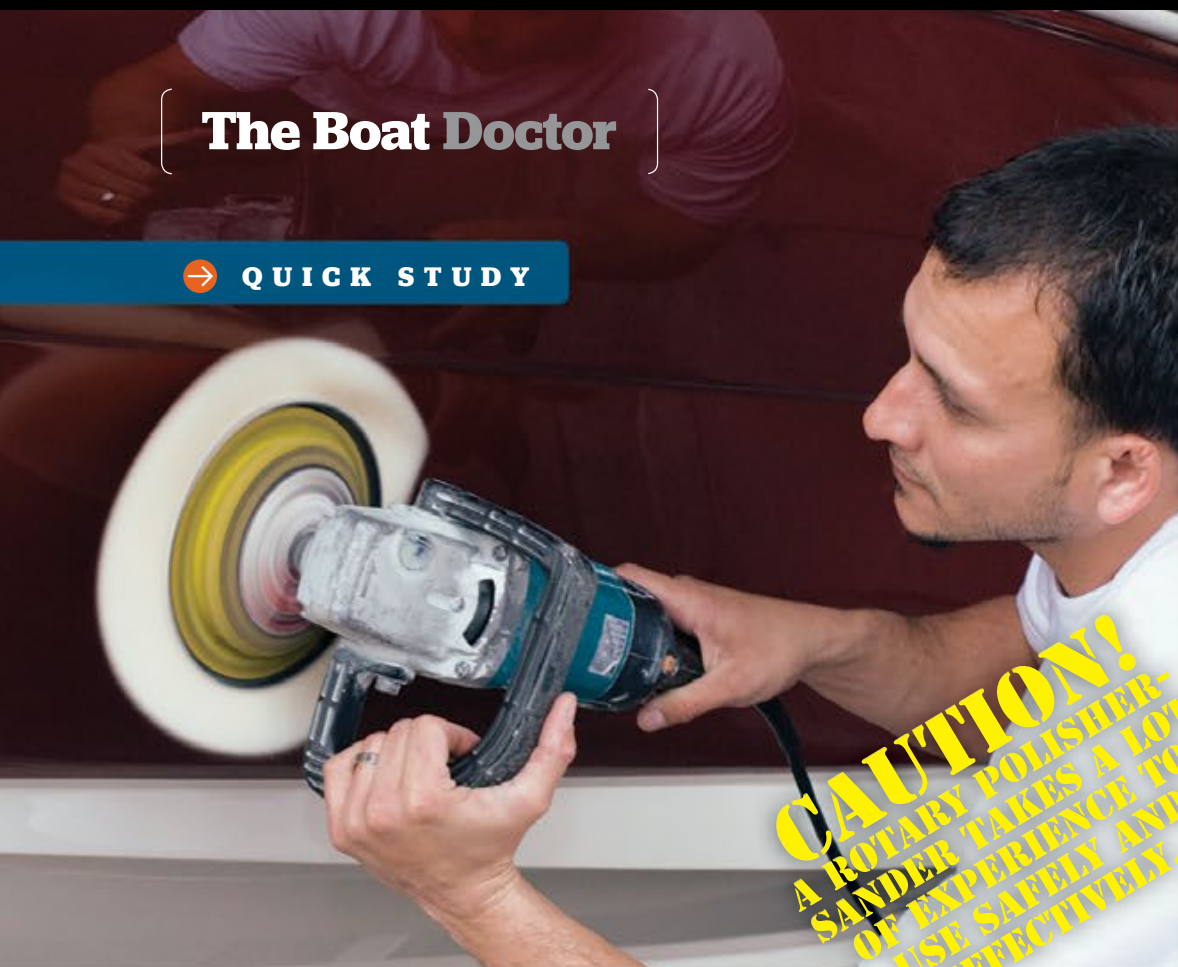
Rated IP67 (for temporary immersion), Blue Sea Systems' WeatherDeck switch panels are designed for areas exposed to moisture and spray, and they offer circuit protection in the form of fuses or breakers. Switch guards prevent accidental tripping. Adhesive labels let you customize your panel. Fused versions offer backlighting. \$57.95 (for No. 4309 WeatherDeck eight-position panel); [starmarinedepot.com](http://starmarinedepot.com) — *J.H.*



**4 RUN THE WIRING** Route a fused positive cable from the battery or battery switch to the panel's positive feed, and run positive wires from each accessory to each switch. Use crimp-on marine ring connectors with heat-shrink collars and a second layer of heat-shrink tubing to connect all wires. Dedicated positive and negative wires from the interior light circuit will activate the backlighting and serve to ground the LED indicators.

**5 INSTALL THE PANEL** Before securing the panel, energize each switch to ensure proper operation. Then remove the top and bottom cover plates and use the supplied self-tapping screws to mount the panel. Recheck the switches. To guard against short circuits, install a Blue Sea panel back cover on the rear of the distribution panel with four small self-tapping screws. Use the supplied adhesive labels to designate switch functions.





**CAUTION!**  
A ROTARY POLISHER-  
SANDER TAKES A LOT  
OF EXPERIENCE TO  
USE SAFELY AND  
EFFECTIVELY.

## Choosing and Using a Buffer

At some point in the life cycle of a boat owner's relationship with his boat, he (or she) will want to apply wax to the fiberglass hull. If you're a first-timer, or someone whose buffing prowess falls short of professional detailer level, here are a few tips we gleaned from Mike Pennington of Meguiar's on the right tool to use, and also what not to do. — Pete McDonald

### Tools of the Trade

Most people have seen a professional use a rotating buffer that spins in circles at high revolutions. These are heavier and produce a lot of power to handle. "If you don't know what

you're doing, you can do a lot of damage or even injure yourself," Pennington says.

An orbital buffer is safer because it vibrates only back and forth, but Pennington cautions it is only

good for applying a thin layer of wax.

For the at-home DIY enthusiast, Pennington recommends a dual-action polisher, which both oscillates and rotates, making it a lot safer and easier to operate. It is much lighter, and also less likely to damage graphics or protruding hardware, but also far faster than working just by hand.

### Dual-Action Polishers

For most boaters, Pennington recommends a polisher that attaches to a power drill, such as Meguiar's DA Power System (\$60, meguiars.com). It comes with three types of 4-inch pads: a more aggressive pad for compound work, a soft pad for waxing and a middle-ground pad for

one-step compounding and polishing.

For more advanced DIY boat detailing, Pennington recommends a dedicated dual-action polisher such as Meguiar's Professional DA MT300 (\$220, meguiars.com). Porter-Cable and Shurhold also make dual-action polishers. Dedicated polishers up the power as well as the size of the pads from 4 inches to 5 to 7 inches.

### Wax On, Wax Off

You can do the process in two steps — first use a compound to buff the gelcoat and rid it of chalky oxidation and other markings. Then apply a wax to protect the hull and make it shine. Or, you can do both steps at once with a multipurpose cleaner wax — these are generally regarded as not as effective but are perfectly fine for finishes that are still in good shape.

Whatever product you choose, start by applying a dime-size dollop on the buffer pad, and then place the pad firmly against the hull. Turn on the buffer and work it in an overlapping 3-by-3-foot section of the boat, and then turn it off and start the process again. Wipe it clean with a microfiber towel and, blammo!, your boat should look showroom-new.



## Just Say No: How Not to Buff

### STOP SHORT

Don't start or stop the buffer unless the pad is pushing firmly against the surface. Otherwise, you'll shoot the product all over the place.

### GLOOP OF GOOP

Don't use too much of the product. If you apply it too thickly, the pad will not be able to do its job but will skid across the gelcoat like a hydroplaning car.

### STEER CLEAR

Don't apply to soft, clear plastics. This is not the thing to use on clear enclosures.



### RAIL TRAVAIL

Don't nick the PVC rub rail. It will definitely leave a mark. Tape off the edges as needed.

### DELICATE DETAILS

Don't press too hard against decals and special lettering such as gold leaf. Work lightly around those areas to avoid tearing the decals.

### PLEASE RECYCLE

Don't throw out the pads. You can run them through your washing machine and reuse them whenever necessary.





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## WHAT TO LOOK FOR

## Dock Lines

**There are myriad choices in dock lines. Just as there is no perfect boat, there is no perfect type of line for use in tying a boat to a dock. That said, the following tips are intended to help you make more informed choices when selecting dock lines for your boat. – Kevin Falvey**

### Material

Nylon is the best choice for a dock line, in my opinion. It offers good resistance to the sun's rays, fuel and chemicals. It stretches 15 percent when loaded to about 20 percent of its breaking strength, providing shock absorbency. Dacron lines soon become too stiff, and polypropylene lines degrade rapidly in sunlight.

### Diameter

Bigger isn't necessarily better. Larger-diameter line won't provide as much cushion as thinner line under equal loads. It may also be cumbersome to fit around existing cleats. As a rule of thumb, use 1/8-inch diameter for every 2 inches of boat cleat length.

### Length

For your home slip, cut and splice the lines to length to suit the tidal range or

expected water level changes. For use at transient docks, we recommend that spring lines be as long as the boat and that bow and stern lines be half the length of the boat. You can always deal with some excess line, but a too-short line can be useless.

### Three-Strand

Less expensive than braid, tougher on the hands and available in limited colors, three-strand nylon provides excellent shock absorbency. When used over wood pilings or poles, three-strand nylon slides down and/or around such pilings easier than other types of line do. It's also easy to splice, if you want to make custom-length lines to suit your boat and slip.

### Double-Braid

More expensive, double-braid line is soft on the hands and supple to coil; it also comes in a kaleidoscope of colors to match your boat. Double-braid provides less shock absorbency because it stretches less than equivalent three-strand line, and, for lines used around pilings, the fine weave may snag, making loops recalcitrant to drop or slide into position.



## FRAYED KNOT

Whether you are making up fresh dock lines or find some frayed ends upon inspection, Star brite Dip-it Whip-it seals the bitter end of your dock lines. It's also useful for color-coding lines, making identification easier. Available in black, red, green, white and clear. \$12.95; starbrite.com — K.F.



**Never rigged a slip before? There are many ways to skin that cat. Tap here or point your browser to [boatingmag.com/how-to-rig-slip](http://boatingmag.com/how-to-rig-slip).**



PHOTOS: (CLOCKWISE FROM TOP) COURTESY WEST MARINE (2), COURTESY STAR BRITE

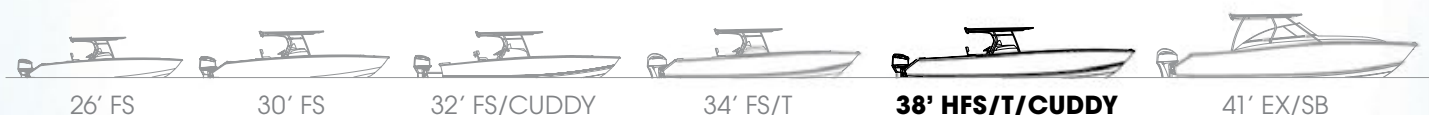


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SWIPE IMAGE FOR GALLERY >>

## Monterey 360SC

**I**F YOU WERE TO DESIRE A VESSEL WITH MORE luxury and livability than what's aboard Monterey's finely detailed 360SC, you'd have to hire a crew to run it. The beauty of the 360SC is the clever way space is maximized to wring the last measure of day-boat essence from its deck plan, and it's so maneuverable that operating it will invite even the less-experienced skippers to the helm.

Sterndrive power is the key to its ease of operation. Even with standard nonjoystick steering, the 360SC pivots easily, crabs sideways for tricky side-to docking and cruises through choppy waters with comfort. Visibility proved panoramic from the helm, and the dual seat offered a great seating or standing position from which to pilot the ship.

Instrumentation was arrayed logically, trim switches were set ergonomically, and electronics space proved ample. The convertible companion seat allows passengers to converse with the skipper and adds to the versatility of the helm deck space.

The combination worked beautifully for us offshore of Boca Raton, Florida. The positive control of the drives was reassuring as we navigated the tricky Boca Raton Inlet. In seas, we tucked the drives in at 30 knots and whipped the helm left and right, enjoying its ability to hold turns, stay on plane and come out of the turns without prop slip or ventilation. We noted too the hull's ability to cleave seas. One would think that in a vessel with so much on board, a cabinet

door, a latch or a hinge might rattle, but none did. We quietly crushed the rollers.

Dockside, a swift current swept past our moorings, which were flanked with more spankin' new Monteareys, barely leaving a couple of feet of clearance on either end. This is where Axius Joystick Piloting makes timid skippers look like old salts. I easily adjusted the 360SC's clearance between the other boats before gently nudging the dockside padding.

Test day dawned with air humid enough to form puddles around cold drinks, but at the helm we kept cool thanks to the air conditioning (\$5,115). How very nice in a hot climate.

Access to the cockpit is via a transom door at the starboard side of the roughly 4-foot swim platform. Yep, there's a shower there to wash off sand or salt, and as you walk through you can grab a cold drink from the cooler drawer in the starboard coaming. Or, with the transom seat laid flat, make like a starfish on the broad sun pad. Flip it up and aft-facing seats become ideal for catching a sunset while on the hook.

Regal's 35 Sport Coupe (\$313,740 with twin 300 hp MerCruiser 350 MAG Bravo Three DTS sterndrives) boasts a comparable transom seating area, but its flip-over seat-back design offers only front- or aft-facing seat backs, not both as does the Monterey. Regal's sliding roof completely opens the cockpit, while better shading the aft seating area.

Another distinction of Monterey's design leadership resides



SWIPE IMAGE FOR GALLERY >>

in the cockpit. Unlike the rounded, puffy seating that is so commonplace, I discovered upholstered settees with crisp, squared edges and generous padding. They're firmly comfortable, offering a secure ride while delighting the eye and giving a firm nod to the angular seating found in European sports cars. Grab rails parrot the angular look with easy-to-grab, rectangular-section stainless steel.

The cabin below offers shattering beauty with a feeling of workmanship, luxury and utility warmly toned in wood and stone. Passages between galley and settee are generous. The galley counter is a stonelike surface with a ceramic cooktop and stainless-steel sink. A stainless-steel fridge doubles cooling capacity when combined with another in the cockpit. Overhead cabinets give secure stowage for neccessaries and easy access to the circuit panel.

NOTEWORTHY

**Monterey's innovation and design have been game changers** in the marketplace. Aboard the 360SC, we were impressed by the electrically actuated walk-through windshield. It's functional, and an engineering feat.

An aft berth is roomy with good headroom, and the V-berth forward makes comfortable a family or two couples. Remember though that this is a day boat. The forward-positioned helm and expanded topside amenities that foster the day-boat mission result in a cabin more suited to serving those enjoying a party topside than being the boat's focal point for entertaining. One *can* weekend aboard, but "berth count" cruising is not what the 360SC was built for.

That said, the woodwork is top-notch. Contrasting hardwood dog-bone inlays add accents, as do contrasting

hardwood cup holders inset on hinged table corners. The design offers a smooth table for dining or a poker-style table for more casual affairs.

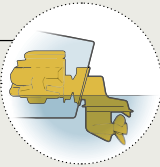
Thoughts of gaming aside, Monterey has also designed entertainment functionality with the sports spectator in mind. Flat-panel TVs with quality speaker systems and generous amps give plenty of viewing options and cabin- or cockpit-filling sound.

We'd be remiss if we simply focused on the comfort and convenience of operating the 360SC. It's been ideally designed for easy maintenance too. A large hatch gives great access to engines, genset and plumbing. Small hatches within the main hatch accommodate quick checks on strainers and dipsticks. Such attention to the "back end" of boating means the front end is more enjoyable for the skipper without a paid crew. And running Monterey's 360SC is too much fun to pawn off to a hired hand. — *Randy Vance*



See a photo gallery of the Monterey 360SC by tapping here or visiting [boatingmag.com/2880](http://boatingmag.com/2880).

AVAILABLE POWER:  
STERNDRIVES



High Points

- ▶ Angular upholstery in the cockpit is visually stunning with supple vinyl.
- ▶ Wet bars in the cockpit add stowage and refreshment surfaces.
- ▶ Head compartment hides the china head beneath a fold-over bench, adding convenience for showering.
- ▶ Cabin hatch slides conveniently beneath the helm for access to the cabin.

Low Points

- ▶ The square grab rails are elegant but might be uncomfortable to grip.
- ▶ Stowage compartments in the starboard coaming are handy and unique, but we'd rather see more space in the cockpit seat bases or walkways with stowage beneath the seats.

▶ LOA: 37'10" ▶ Beam: 11'11" ▶ Draft (max): 3'6" ▶ Displacement (approx.): 17,000 lb.  
▶ Transom Deadrise: 17 degrees ▶ Bridge Clearance: 10'0" ▶ Fuel Capacity: 250 gal.  
▶ Max Horsepower: 860 ▶ Available Power: Twin MerCruiser or Volvo Penta gasoline sterndrives to 860 hp total

Price: \$375,357 (with test power)

BOATING Certified Test Results

SPEED			EFFICIENCY				OPERATION		
rpm	knots	mph	gph	naut. mpg	stat. mpg	n. mi. range	s. mi. range	angle	sound level
1000	6.52	7.50	1.70	3.83	4.41	863	993	0	72
1500	7.43	8.55	5.20	1.43	1.64	321	370	0	74
2000	8.78	10.10	9.90	0.89	1.02	199	230	1	74
2500	10.17	11.70	12.70	0.80	0.92	180	207	3	80
3000	12.04	13.85	15.00	0.80	0.92	181	208	3	82
3500	19.73	22.70	22.20	0.89	1.02	200	230	3	84
4000	25.20	29.00	32.00	0.79	0.91	177	204	2	85
4500	32.59	37.50	41.10	0.79	0.91	178	205	1	86
5170	36.06	41.50	46.80	0.77	0.89	173	200	1	89

MOST ECONOMICAL CRUISING SPEED

HOW WE TESTED

ENGINE: Twin 320 hp MerCruiser 377 MAG ECT DRIVE/PROP: Bravo Three/21" pitch, stainless-steel propset GEAR RATIO: 2.20:1 FUEL LOAD: 60 gal. CREW WEIGHT: 800 lb.

Monterey Boats Williston, Florida; 352-529-9161; montereyboats.com



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## Grady-White Express 330

**I**N TODAY'S MARKETPLACE, WITH THE INVESTMENT offshore anglers make in their vessels, it's not enough to simply lay all the accouterments of a fisher's battlewagon on the keel as in the days of *Islands in the Stream*. Today, the fishing boat must tickle many palates, and no matter the angler's gender or fire for fishing, an express-style boat must be fitted with more than state-of-the-art fish boxes, livewells, strategically mounted rod holders and a bait prep station. Such a boat must nearly drip luxury and comfort, because who, after all, wants to go out for hours or days on the high seas, back braced against a hard bench or unpadded coaming, eating soggy subs and using a bucket for ... well, let's just say the less genteel necessities? Nobody.

So Grady-White looked at the line drawings for this express and found beautiful ways to make it more fishable, while offering greater comfort than on the no more manly but far less featured vessels of the storied times of Ernest Hemingway or Zane Grey.

The Express 330 is among the most opulent, yet fishable, express boats we've tested. The new 330 lacks nothing for adventurous anglers, boasting an optional refrigerated fish box at the transom among other improvements. An optional Fischer Panda 4,200 kW genset below deck keeps refrigeration both for fish and refreshments fired up. It also can power an air-conditioner with vents in the cockpit (optional at \$5,115) and the standard AC in the living quarters below for taking the steam

out of a Gulf Stream day.

The cockpit provides a broad playing field for bringing big fish aboard. The sole is beautifully diamond-plated with fiberglass nonskid. Under-gunwale rod holders boast downrigger cannonball holders. Integrated toe rails styled into the rod and downrigger racks speak to superior planning for function and beauty. For long-range fishing, a transom seat extends into the cockpit and stows instantly and easily with a flick of the arm.

And stable at rest? Oh, my. Grady's building experience spans 50 years — and that in creating vessels for the most robust fishing conditions, nasty inlets, long offshore runs and changeable sea conditions. The Express 330 boasts the expected high bows of a Carolina-built boat, sure. But in mixed seas it has to be credited for giving solid footing that exceeds the expectations raised by its wide beam.

Grady-White's livewells are unsurpassable in proper aeration, thanks to a plenum that supplies water flow evenly from bottom to top, as in the one located in the starboard mezzanine. Its portside mezzanine rigging station provides a freshwater sink and three drawers for easy access to gear. For added durability, stainless-steel gas struts hold the lids open while in use.

Luxury continues in the command deck. Grady positioned the helm at the center, surrounding the skipper with luxury seating for his guests. The effect keeps the social nature of boating at the heart of any cruise and the skipper at the center



➔ **Grady-White** Express 330

SWIPE IMAGE FOR GALLERY >>

of that. In a blend of luxurious bling and secure practicality, the electronics panel pops up electrically, giving ample space for dual chart plotters and VHF radio. If you run it down in port, the gear is secure, out of sight, to survive the nuisance of nefarious dock rats.

Luxury below deck is almost astonishingly elegant in simplicity. A portside galley sink is set in a cast granitelike surface surrounded with a fiddle rail to keep kitchenware from sliding off. Lighting is ample but soft, and the mother-of-pearl backsplash is a 24-carat touch. The V-berth is easily

■ **NOTEWORTHY**

**Grady-White's Express 330 is beautifully equipped** for fishing and cruising. The retractable instrument panel keeps chart plotters and other electronics secure in port.

accessed via a wraparound couch. Below it, to port, is another simple touch — a compartment ideally sized for three stowage containers. To starboard, the dinette settee converts quickly to a single berth. An aft cabin is so easy to access, the skipper might claim that and not the traditional forward berth as his own. A roomy fiberglass head compartment with shower, sink and china toilet adds the final touch to the luxury and comfort that enhance the extreme fishability of this opulent cruiser.

Boston Whaler makes a rugged, fishable express that vies for the same

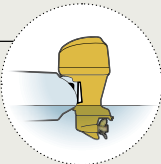
boaters Grady seeks. While Grady powers with Yamaha, Whaler's 345 Conquest (\$441,000 with triple 250s) boasts

Mercury Verado outboards. You'll find Whaler factory-rigs Raymarine navigation systems, and, while comfortable cruising features are firmly in place, you won't find mother-of-pearl on the galley backsplash. (I liked it, but you'll have to decide if that does it for you.)

Ease of operation is the mantra of Grady-White, and so it makes special effort to give unobstructed access to livewell pumps through hull hatches and fuel filters. The only surprises we found in bilge access were seacocks located inconveniently below the aft berth rather than under the cockpit deck hatch. To be fair, that awkwardness could've been due to the addition of the genset. If you opt for that, and you'd need it to power the air-conditioner and refrigerated fish boxes while at sea, you'll find checking oil and other routine maintenance can be easily done, without hiring a washout from the Cirque du Soleil. Would Hemingway approve? Well, I'm sure he'd say, "Having ice for the whiskey is a damned good start." — *Randy Vance*



To see our full video review of the Grady-White Express 330, tap here or go to [boatingmag.com/2881](http://boatingmag.com/2881).



AVAILABLE POWER:  
OUTBOARDS

**High Points**

- ▶ Starboard side of dinette wraparound couch converts to a midship berth.
- ▶ There's easy access to the circuit breaker control panel to port of steps to the sole.
- ▶ Helm deck seating accommodates up to eight passengers.
- ▶ Fold-out transom seat functions smoothly and easily for maximum versatility and comfortable seating while on a cruise.

**Low Points**

- ▶ Some of the seacocks were accessible only via the aft berth belowdecks.
- ▶ Grady-White doesn't factory-install navigation equipment, leaving that to the buyer and dealer.

▶ **LOA:** 35'10" ▶ **Beam:** 11'7" ▶ **Draft:** 2'1" (motors up) ▶ **Displacement (approx.):** 10,840 lb. (plus engines) ▶ **Transom Deadrise:** 19 degrees ▶ **Bridge Clearance:** 9'10" ▶ **Max Cabin Headroom:** 6'2.5" ▶ **Fuel Capacity:** 331 gal. ▶ **Water Capacity:** 44 gal. ▶ **Max Horsepower:** 700 ▶ **Available Power:** Yamaha outboards to 750 hp

**Price: \$404,450** (base price with test power)

▼ **BOATING Certified Test Results**

SPEED			EFFICIENCY				OPERATION		
rpm	knots	mph	gph	naut. mpg	stat. mpg	n. mi. range	s. mi. range	angle	sound level
1000	4.39	5.05	2.90	1.51	1.74	451	519	1	69
1500	7.00	8.05	5.30	1.32	1.52	393	452	1	72
2000	8.56	9.85	9.10	0.94	1.08	280	322	2	77
2500	11.34	13.05	11.30	1.00	1.15	299	344	3	80
3000	17.94	20.65	17.80	1.01	1.16	300	346	4	84
3500	23.42	26.95	22.00	1.06	1.23	317	365	4	84
4000	28.20	32.45	28.20	1.00	1.15	298	343	3	87
4500	32.59	37.50	36.60	0.89	1.02	265	305	2	88
5000	36.28	41.75	44.20	0.82	0.94	245	281	2	90
5500	40.45	46.55	59.50	0.68	0.78	203	233	2	93
5800	44.01	50.65	60.00	0.73	0.84	219	250	2.0	94.0

MOST ECONOMICAL CRUISING SPEED

**HOW WE TESTED**

**ENGINE:** Twin Yamaha F350 **DRIVE/PROP:** SWS XL SDS 16¼" x 17" 3-blade stainless **GEAR RATIO:** 1.73:1 **FUEL LOAD:** 75 gal. **CREW WEIGHT:** 330 lb.

**Grady-White** Greenville, North Carolina; 252-752-2111; [gradywhite.com](http://gradywhite.com)



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# Chaparral 307 SSX

**W**HILE EVERYONE COULD USE A BIGGER boat, the concept of “bigger is always better” did not always apply unilaterally. While some boaters moving up from the family bowrider to a pocket cruiser, sedan or express have aspirations to boat overnight, many boaters really just want a much bigger version of an open bow boat to use during the day. Hence we see the most welcome development of the day boat, like the 307 SSX 50th Anniversary Edition I tested, executed to the highest degree by Chaparral Boats.

Outfitted with twin 300 hp MerCruiser MAGs paired with Bravo Three sterndrives, our test boat sprinted to over 50 mph on a windy, choppy day. With the optional speed-scraping hardtop (\$7,377), this number stood as a reminder that you can go big and still achieve impressive performance. The boat’s hull design, Chaparral’s signature extended V-plane hull that molds in afterplanes to extend the running surface past the propulsion point, helps with that. The V-plane and the steep 22-degree deadrise helped the 307 SSX nullify any bay chop

we encountered.

With the 307, Chaparral strictly adheres to the day boat concept — there’s no cuddy cabin or changing room hidden under one of the consoles. (If you really want sleepover potential, it offers the 327 SSX for that purpose.) Instead you’ll find massive stowage underneath the helm console with a built-in trash receptacle. You’ll find a well-appointed head in the

port console with 4 feet 3 inches of headroom, an optional vacuum-flush, pump-out head (\$809) and a faux teak sole. The large port allows in plenty of sunlight, and it opens to let in ample fresh air.

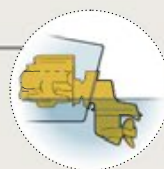
The bow cockpit has fantastic seating with forward-facing recliners on the consoles with flip-up armrests. A filler cushion creates a sun lounge, and there’s a chock for the cockpit table. There’s also an insulated cooler built into the bow step. Note how the cushions open front to back on gas struts to access the storage.

The main cockpit features twin double-wide chairs with flip-up bolsters in front of the helm and the port console. An entertainment center can be installed behind the helm, and the seating array makes for a great conversation pit around the cockpit table. What a great way to spend the day on the water. — *Pete McDonald*

## MORE ONLINE

To see a photo gallery of the Chaparral 307 SSX, visit [boatingmag.com/2882](http://boatingmag.com/2882).

AVAILABLE POWER:  
STERNDRIVE



## High Points

- ▶ Anchor-locker hatch features low-maintenance friction hinges that can be adjusted with an Allen wrench.
- ▶ Head has a large, vented port for light and air circulation.
- ▶ Rumble seat on the transom converts to a sun lounge with the convenient push of a button.

## Low Points

- ▶ There’s no access to the release pin for the electric engine hatch, but Chaparral says the hatch is spring-loaded, so, if you’re strong enough, you can “manually override” it if needed.
- ▶ Like a lot of large day boats, the 307 SSX exhibited high bow rise while climbing onto plane.

## Toughest Competitor

- ▶ Cobalt Boats builds a 302 that starts at \$201,372 with a pair of MerCruiser 350 MAGs.

▶ LOA: 30'6" ▶ Beam: 9'6" ▶ Draft (max): 3'0" ▶ Displacement (approx.): 8,400 lb.  
▶ Transom Deadrise: 22 degrees ▶ Max Headroom (in head): 4'3" ▶ Bridge Clearance: 9'1" ▶ Fuel Capacity: 125 gal. ▶ Water Capacity: 20 gal. ▶ Max Horsepower: 760 ▶ Available Power: Single or twin Volvo Penta or MerCruiser gasoline sterndrives to 760 hp

**Price: \$228,999** (as tested)

## BOATING Certified Test Results

SPEED			EFFICIENCY				OPERATION	
rpm	knots	mph	gph	naut. mpg	stat. mpg	n. mi. range	s. mi. range	angle
1000	5.43	6.25	3.40	1.60	1.84	180	207	2
1500	6.65	7.65	5.00	1.33	1.53	150	172	4
2000	9.43	10.85	9.40	1.00	1.15	113	130	7
2500	18.55	21.35	14.00	1.33	1.53	149	172	3
3000	21.38	24.60	15.60	1.37	1.58	154	177	3
3500	28.76	33.10	18.80	1.53	1.76	172	198	3
4000	32.24	37.10	26.20	1.23	1.42	138	159	2
4500	36.67	42.20	31.00	1.18	1.36	133	153	2
5100	44.71	51.45	40.00	1.12	1.29	126	145	2

MOST ECONOMICAL CRUISING SPEED

## HOW WE TESTED

ENGINE: Twin 300 hp MerCruiser 350 MAG gasoline sterndrives DRIVE/PROPS: Bravo Threes with 24-inch pitch Bravo Three propsets GEAR RATIO: 2.20:1 FUEL LOAD: 100 gal. CREW WEIGHT: 380 lb.

Chaparral Boats Nashville, Georgia; 229-686-7481; [chaparralboats.com](http://chaparralboats.com)

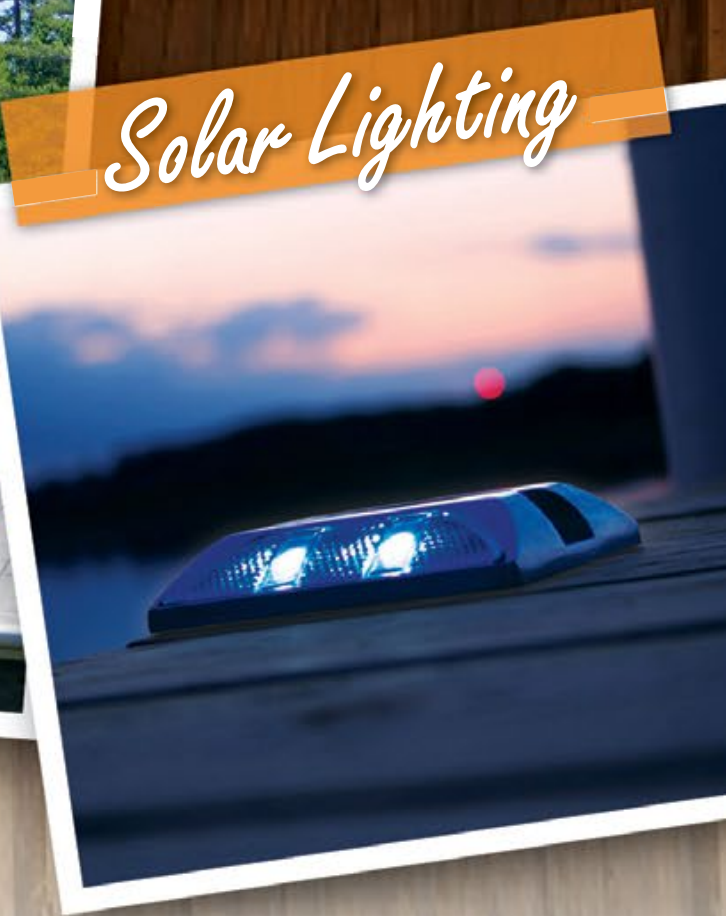
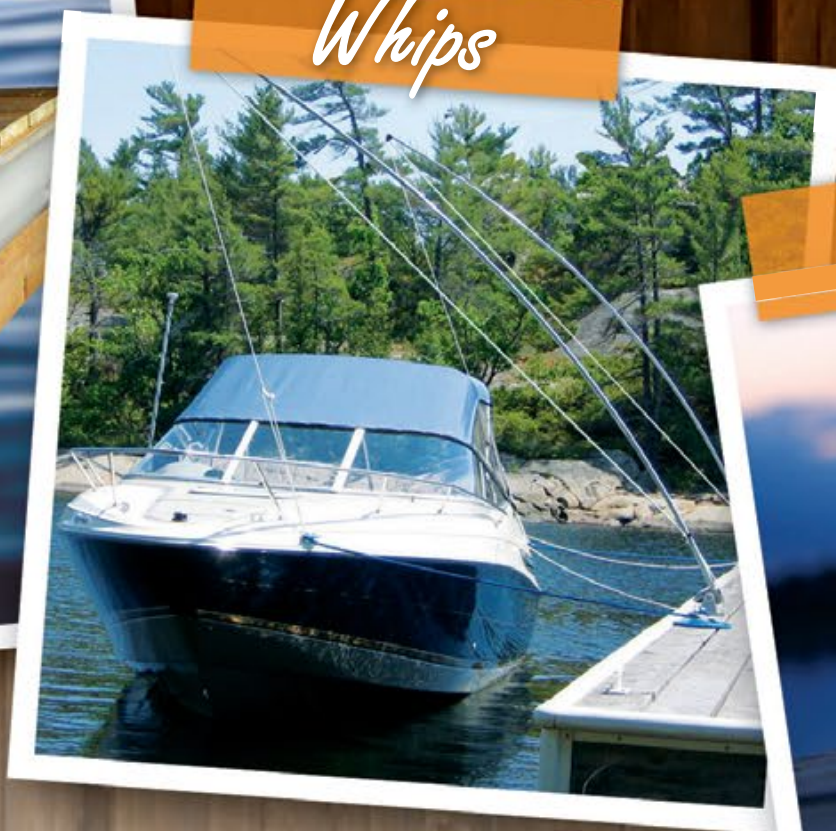
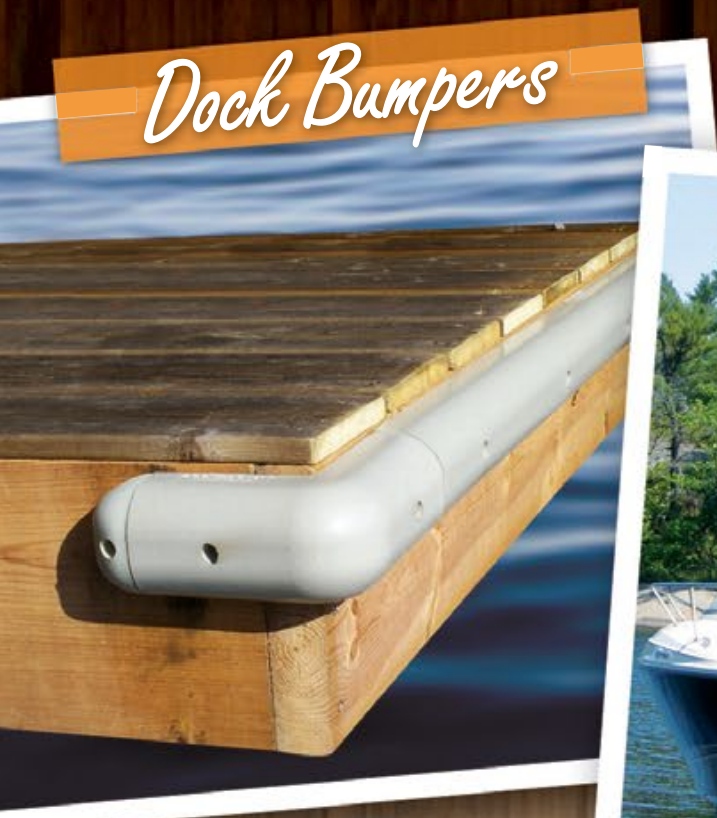




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## SeaVee 270Z Bay

**S**EAVEE'S NEW BAY BOAT IS A STRETCH — both figuratively and literally. At 27 feet in length, the 270Z Bay is the largest model in the category (also the smallest boat in SeaVee's stable). Its sweeping sheer line stands in contrast to the low-profile foredecks associated with bay boats.

Yet the elevated casting platforms reflect the bay boat genre. Measuring 92 inches wide and 78 inches along the centerline, the foredeck is expansive. The aft casting platform measures 98 inches wide and 42

### EXTRA POINT

**Mount an electric bow trolling motor** using an optional molded fiberglass piece with a pad for the motor bracket. Batteries install in the central forward locker.

inches along the centerline. Diamond nonskid assures traction. There's no motor splashwell; the outboard mounts on a SeaStar hydraulic jack plate.

All 17 hatches are resin-transfer-infused for a smooth underside finish. Among the lockers are fore and aft pressurized livewells (24 and 30 gallons),

an anchor locker, a pair of 75-gallon fish boxes in the bow, two rod lockers that will accept 9-foot sticks, a 107-gallon forward dry storage compartment and a pair of 17-gallon release wells in the aft deck.

The helm leaning post will accommodate two, while two others can rest in a jump seat with a backrest that lifts up from the aft casting platform. A seat forward of the center-console has a 17-gallon cooler below.

The 31-inch helm panel on the center-console easily accommodated the flush-mount Simrad NSS16 evo2 display on my tester. A wraparound tempered-glass

windshield protects a glove box on top of the console. Fiddled trays on either side are great for stowing tubes of sunscreen and sunglasses. A door at the front of the console offers access to helm rigging, battery switch and other accessories, but there's no room to use this as a head compartment.

The 270Z features a cross-ventilated twin-step hull with a central air-reservoir unit that maintains the necessary air cavities to reduce drag at a wide range of speeds. It lifts nicely, planing at speeds as low as 15.5 mph.

Abrupt course changes at speed proved predictable thanks to a design that produces opposing pressure on the speed rails to prevent the hull from catching an edge.

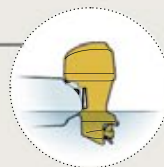
The high prow and flaring bow knock down spray but also create more windage than you might expect with a bay boat. The hull draws just 15 inches of water.

Powered by Mercury's new 350 Verado, the 270Z vaulted from 0 to 30 mph in 9.5 seconds en route to a top speed of 57.3 mph at 6,000 rpm. — *Jim Hendricks*

### MORE ONLINE

For a photo gallery of the SeaVee 270Z Bay, visit [boatingmag.com/2883](http://boatingmag.com/2883).

AVAILABLE POWER:  
OUTBOARD



### High Points

- ▶ Expansive casting platforms allow as many as five anglers to fish at a time.
- ▶ You're not confined to bay fishing; you can also venture offshore.
- ▶ The 9-foot-1-inch beam offers exceptional at-rest stability.

### Low Points

- ▶ There's no head compartment on this 27-footer.
- ▶ High prow creates more windage than on a lower-profile bay boat.
- ▶ Low freeboard makes it tough to convince your wife it's a family boat.

### Toughest Competitor

- ▶ The Pathfinder 2600 HPS bay boat (\$82,505 base price with a single Yamaha F300) also has a twin-step running surface but is 10 inches shorter and carries 22 gallons less fuel.

▶ **LOA:** 27'0" ▶ **Beam:** 9'1" ▶ **Draft:** 1'3" (motor up) ▶ **Displacement:** 3,500 lb. (without power) ▶ **Transom Deadrise:** 17 degrees ▶ **Bridge Clearance:** 6'0" (without top) ▶ **Fuel Capacity:** 100 gal. ▶ **Max Horsepower:** 450 ▶ **Available Power:** Single or twin Mercury or Yamaha outboards to 450 hp

**Price: \$104,100** (with single Mercury 300 Verado)

### BOATING Certified Test Results

SPEED			EFFICIENCY				OPERATION		
rpm	knots	mph	gph	naut. mpg	stat. mpg	n. mi. range	s. mi. range	angle	sound level
1000	4.30	4.95	1.24	3.47	3.99	312	359	0	66
1500	5.91	6.80	2.15	2.75	3.16	247	285	0	72
2000	7.56	8.70	4.37	1.73	1.99	156	179	4	74
2500	8.65	9.95	6.40	1.35	1.55	122	140	8	74
3000	12.86	14.80	8.40	1.53	1.76	138	159	4	81
3500	25.98	29.90	9.90	2.62	3.02	236	272	2	84
4000	31.63	36.40	11.60	2.73	3.14	245	282	2	86
4500	37.06	42.65	14.80	2.50	2.88	225	259	2	89
5000	40.32	46.40	15.90	2.54	2.92	228	263	2	91
5500	46.14	53.10	23.70	1.95	2.24	175	202	2	92
6000	49.79	57.30	30.80	1.62	1.86	145	167	2	95

MOST ECONOMICAL CRUISING SPEED

### HOW WE TESTED

**ENGINE:** Single 350 hp Mercury 350 Verado **DRIVE/PROP:** Mercury Enertia ECO 16" x 19" 3-blade stainless steel **GEAR RATIO:** 1.75:1 **FUEL LOAD:** 40 gal. **CREW WEIGHT:** 425 lb.

SeaVee Boats Miami, Florida; 305-759-6419; seaveeboats.com



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**FORWARD DRIVE**

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# Premier 241 Cast A Way

**WE SAY** Many a pontoon owner has thrown a rod or two on board to take advantage of the boat style's space, stability and ability to float in shallow water. So it's no surprise to see dedicated fishing pontoons like the new Premier 241 Cast A Way.  
Premier built two matching

high-back executive chairs in corners of the bow to serve as fishing chairs. Each corner features a molded-in cup holder, a stereo speaker and a flip-up rod holder. A vertical rod rack for three fishing rods hides behind the port seat. The fishiest feature on the boat, though, is the Captain's Station on the transom. It is a molded fiberglass component with a recirculating livewell in the center, lockable tackle drawers with slots for three trays to either side, stand-up rod holders, cup holders and space to mount a fish finder. Two high-back deluxe fishing chairs flank it. The elevated SpinCaster helm offers a flush-mounted Humminbird 386ci color fish finder and the lockable rod holder behind the captain's chair. A 40-gallon livewell resides at the front of the helm console in addition to a sink and paper-towel holder. With the 115 hp Mercury FourStroke outboard, the 241 Cast A Way approached 30 mph while climbing onto plane in 2.2 seconds.  
— Pete McDonald

**WHO'D WANT ONE** Anglers who love a pontoon's space and amenities.  
**ANOTHER CHOICE** Lowe makes a fishingcentric SF234 that starts at \$24,015 with a 115 hp Yamaha.

**BOTTOM LINE** \$47,161 (as tested);  
pontoon.com

▼ BOATING Certified Test Results										
rpm	SPEED			EFFICIENCY					OPERATION	
	knots	mph	naut. gph	stat. mpg	n. mi. range	s. mi. range	angle	sound level		
1000	2.17	2.50	0.70	3.10	3.57	84	96	1	66	
1500	3.65	4.20	1.10	3.32	3.82	90	103	2	68	
2000	6.08	7.00	1.50	4.06	4.67	109	126	3	72	
2500	6.78	7.80	2.00	3.39	3.90	92	105	3	73	
3000	9.91	11.40	2.50	3.96	4.56	107	123	3	74	
3500	11.38	13.10	3.30	3.45	3.97	93	107	2	76	
4000	13.99	16.10	4.40	3.18	3.66	86	99	2	80	
4500	16.25	18.70	6.00	2.71	3.12	73	84	1	82	
5000	18.68	21.50	7.10	2.63	3.03	71	82	1	84	
5500	20.42	23.50	9.00	2.27	2.61	61	71	1	85	
6000	25.03	28.80	11.50	2.18	2.50	59	68	1	86	
MOST ECONOMICAL CRUISING SPEED										
▶ LOA: 24'5" ▶ Beam: 8'6" ▶ Draft: 3'0" ▶ Displacement (approx.): 2,250 lb.										
<b>HOW WE TESTED</b> Engine: 115 hp Mercury FourStroke outboard Drive/Prop: 15¼" x 15" 3-blade stainless steel Gear Ratio: 2.07:1 Fuel Load: 9 gal. Crew Weight: 170 lb.										

PHOTO: COURTESY PREMIER MARINE

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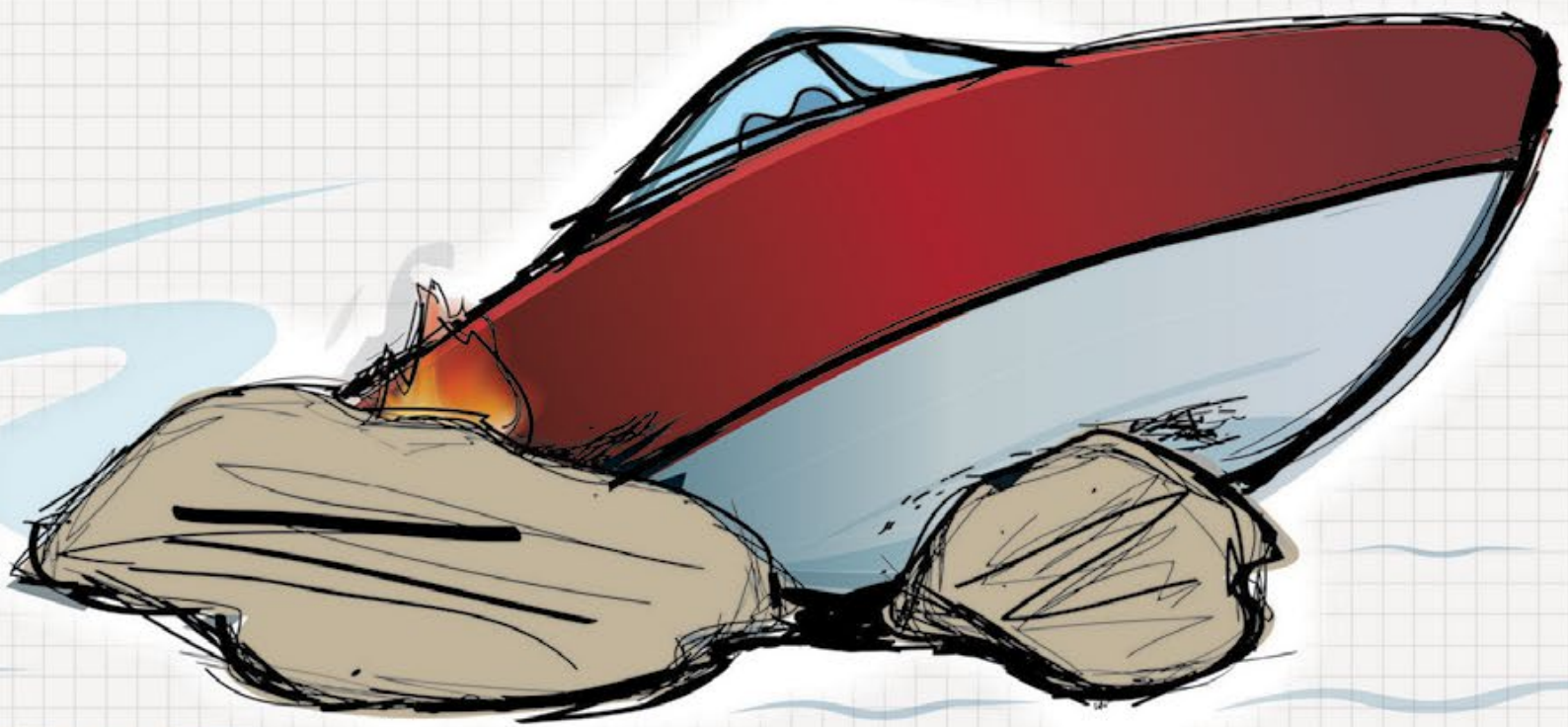




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## Scarab 165 HO Impulse

PHOTO: COURTESY SCARAB JET BOATS

**WE SAY** Whew! What a ride. The mightiest model in the shortest of the new Scarab jet-boat fleet for 2015, the 250 hp 165 HO Impulse proved nimble enough to turn practically in its own length — at wide-open throttle. That the boat offers ample stowage space and a capacity for five passengers is as

remarkable as the driving experience enjoyed from its wide-open cockpit. Sitting tight in two of the three available forward-facing, spring suspension bucket seats for the test, my partner and I fairly flew over the top of the considerable chop that tried to slap us from the sleek, neon-color craft. We made wide-open, downwind runs that topped 50 mph at 8,000 rpm and had us grinning. We gripped the wheel and handholds in anticipation of jolts and jarring that never materialized as the 21-degree deadrise hull creased the waves. The 165 HO Impulse can execute almost scarily tight turns and maneuvers at speed. When it came time to dock the boat in tight quarters, it became apparent that I could use more practice time at the controls of a spirited jet boat that's raring to go the instant it's slipped into gear. — *Dan Armitage*

**WHO'D WANT ONE** Thrill-seeking boaters wanting the sharpest-looking 16-footer afloat.

**ANOTHER CHOICE** The Scarab 165 HO Impulse owns its segment for jet boats that are under 16 feet. The closest jet-powered sport boat is Yamaha's 210 hp AR192 (\$32,999).

**BOTTOM LINE** \$28,067 (with test power and trailer); scarabjetboats.com

### ▼ BOATING Certified Test Results

rpm	SPEED			EFFICIENCY				OPERATION	
	knots	mph	gph	naut. mpg	stat. mpg	n. mi. range	s. mi. range	angle	sound level
1800	1.74	2.00	0.30	5.79	6.67	104	120	0	80
2500	2.61	3.00	1.00	2.61	3.00	47	54	0	81
3000	4.25	5.00	2.50	1.75	2.00	31	36	0	83
3500	6.82	7.90	3.00	2.27	2.61	38	43	0	84
4000	7.82	9.00	3.50	2.23	2.57	40	46	0	85
5000	8.26	9.50	4.00	2.06	2.38	37	43	0	88
5500	24.33	28.00	6.00	4.06	4.67	73	84	0	90
6000	27.00	30.00	8.00	3.38	4.13	61	74	0	99
6500	33.20	39.00	9.00	3.69	4.33	66	78	0	101
7000	37.37	43.00	12.00	3.11	3.58	60	62	0	105
7500	40.84	47.00	14.00	2.92	3.36	53	60	0	110
8000	46.06	53.00	18.00	2.56	2.94	46	53	0	112

MOST ECONOMICAL CRUISING SPEED

► LOA: 15'9" ► Beam: 7'1" ► Draft: 1'0" ► Displacement (approx.): 1,600 lb.

#### HOW WE TESTED

ENGINE: Single 250 hp BRP Rotax RTX 1.5L supercharged HO  
2500 PROP: Jet IMPELLER DIAMETER: 6.34" FUEL LOAD: 20 gal.  
CREW WEIGHT: 400 lb.

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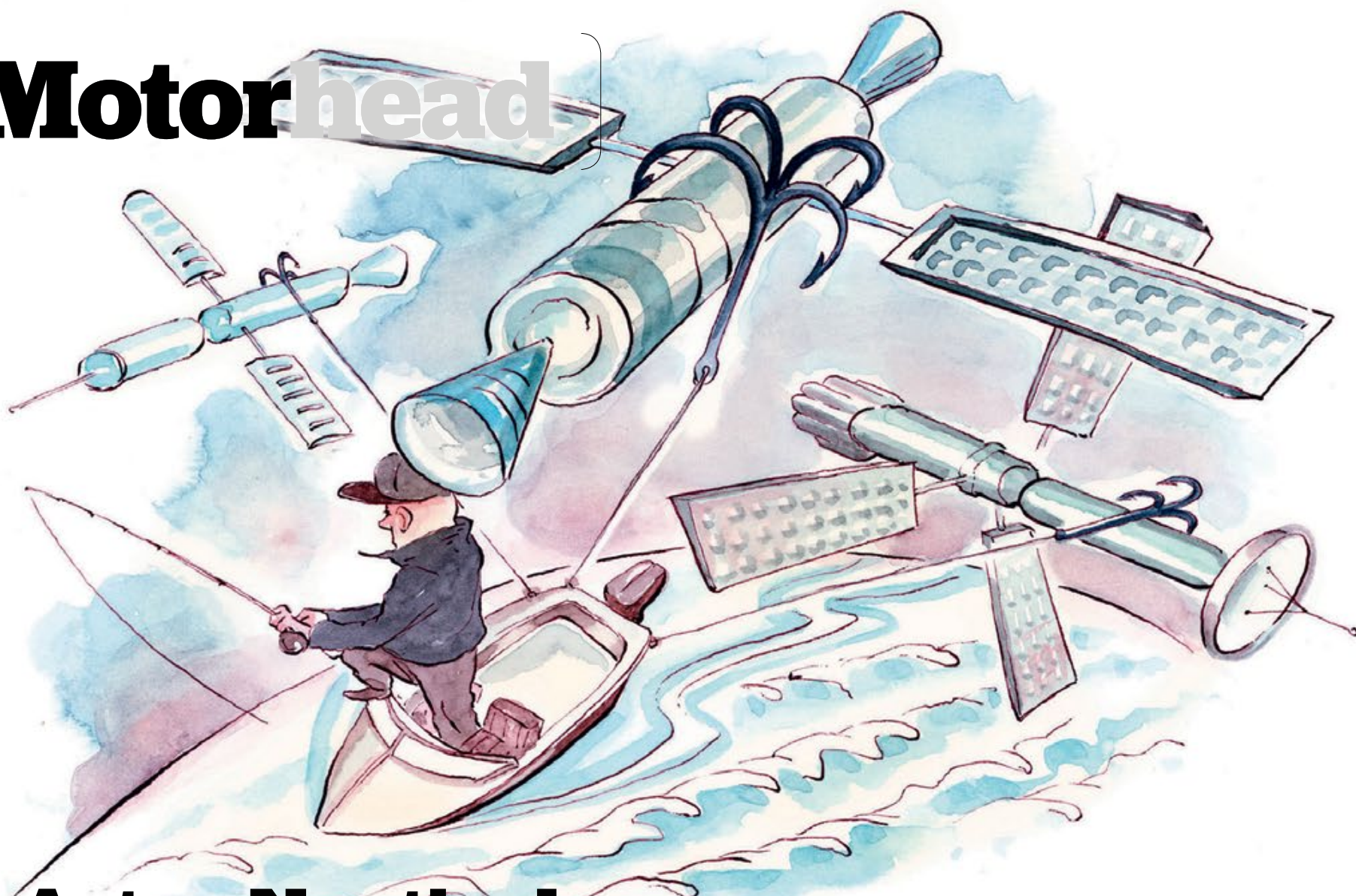
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# Motorhead



## Astro-Nautical Anchors

DO AUTOMATIC POSITIONING SYSTEMS DELIVER ON THE PROMISE?

**A**UTOMATIC POSITIONING SYSTEMS THAT USE PROPULSION to hold a boat on station at the push of button have been on the market for a few years now, enough time for me to gain experience and form an opinion about the practicality of such technology.

Part of GPS-guided propulsion/autopilot packages, these virtual anchor functions include Skyhook from Mercury Marine and the Dynamic Positioning System from Volvo Penta, as well as Minn Kota's Spot-Lock and MotorGuide's anchor mode, which works with a Lowrance HDS unit.

### Trolling Motor Systems

Designed to serve as fishing tools, the systems from Minn Kota and MotorGuide both use single bow-mounted electric trolling motors, which can swivel 360 degrees and employ variable speeds to keep the boat "anchored."

Spot-Lock is a feature of Minn Kota's i-Pilot, which integrates GPS with the Ulterra, Terrova, PowerDrive V2 and Riptide trolling motors. Push a button on a wireless

remote to activate Spot-Lock. You can also control the i-Pilot with a networked Humminbird multifunction display.

When networked with a Lowrance HDS multifunction display with SmartSteer, MotorGuide's Xi5 Pinpoint electric-steer trolling motors offer anchor mode, among other functions. You can activate anchor mode from the display's touch screen.

I've used both systems in very challenging conditions — Spot-Lock on a 16-foot G3 in the unrelenting currents where Michigan's Lake St. Clair funnels into the Detroit River, and MotorGuide's anchor mode on a Yellowfin 24 Bay in

narrow cuts along the Florida Keys during rampaging tide swings.

Both perform silently with remarkable precision in keeping the boat in position. As with a

conventional anchor, the bow tends to point into the current or wind, whichever is stronger.

Unlike with an anchor, there is little swing. The boat holds tight



With built-in GPS, Minn Kota's i-Pilot electric trolling motor system lets you "anchor" a boat with the push of button.

ILLUSTRATION: TIM BOWER; PHOTOS: COURTESY MINN KOTA



LUXURY WITHOUT LIMITS



## *Introducing Infinity*

Introducing Infinity, a new pontoon series from Lowe that raises the bar for comfort, performance and style. Available in two configurations at 25 and 27 feet, each spacious Infinity pontoon features an array of premium amenities for all-day convenience. Diamond-weave accents lend a sophisticated edge to plush, expansive lounge seating. Trim level and ergonomics are superior throughout. And with capacity for up to 14 people and a horsepower rating up to 300hp, the opportunities for enjoyment are limitless.

[LOWEBOATS.COM/INFINITY](http://LOWEBOATS.COM/INFINITY)

  
**INFINITY**

**LOWE**  
PONTOONS





Mercury Skyhook relies on engines and GPS (left). Trolling motor “anchors” can help you catch fish (below).

my experience, that hasn't panned out, mostly because of the noise, vibration, exhaust fumes and constant thumping as multiple drivetrains rev and shift to hold the boat in position — not exactly the peace and quiet most anglers have in mind. Also, with fishing lines draping over the sides with engines in gear, the chances of fouling a propeller increase significantly.

### Remain Vigilant

If you're using an automatic positioning system, resist the temptation to set and forget. Engines stall. Fuses blow. Electronics blank out. Any of these can short-circuit a virtual anchoring system. If your head's not in the game, you'll quickly be at the mercy of wind and current. Need to relax? Drop the old-fashioned anchor in a quiet cove. Better yet, find a dock and tie up. That's a positioning system you can trust most. — *Jim Hendricks*

to the position you set. If you want to move, you can jog side to side or back and forth to fish new areas — a valuable function when, for example, you're fishing wrecks or the edges of a river channel.

Sounds perfect, but there are drawbacks. Electric trolling motors are relegated to freshwater fishing boats and bay boats with low-profile bows. Trolling-motor shafts aren't long enough for boats with high bows. Also, to adequately control a boat larger than 20 feet, you need a 36-volt system, which means three heavy 31-series deep-cycle batteries dedicated to the trolling motor.

### Multiengine Systems

Mercury Marine has led the development of virtual anchoring with its Skyhook — a feature of its joystick low-speed steering technology available for the Zeus pod-drive systems, Axis sterndrive installations and multiple Verado outboards. Volvo Penta's IPS pod drives are also available with Dynamic Positioning System.

All use one or more GPS receivers and multiple engines to automatically hold the boat in position at the press of a button. I have tried these in a variety of situations and found them particularly useful along crowded waterways, when waiting for a drawbridge to open or standing by for a spot at the fuel dock. If there's a strong current, you'll really love these systems for holding steady, saving the helmsman a lot of work.

Plus, if you're running the boat single-handed, you can also use an automatic positioning system to

take over temporarily while you rig fenders and lines before docking the boat.

Initially, I also thought these systems would prove a godsend for larger fishing boats — a way to precisely target fish on wrecks or in passes without anchoring. Yet in



PHOTOS: (CLOCKWISE FROM TOP) COURTESY MERCURY MARINE; JIM HENDRICKS, COURTESY LEHR



## New 25 hp Propane Outboard

The Lehr 25 is the world's most powerful propane outboard. The two-cylinder, 30.4-cubic-inch four-stroke comes in manual and electric-start models, 15- or 20-inch shafts, and tiller or remote versions. It has an overhead cam and is rated 6,000 rpm. Starting at \$4,295; [golehr.com](http://golehr.com) — *J.H.*



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# VALUE PACK

## SIX GREAT BOATS

UNDER \$20,000

BY PETE MCDONALD

**The day has dawned upon us,** the recreational boaters of the world, when we can find six-figure price tags on 21-foot runabouts. (Google it if you don't believe me.) That revelation alone might prompt the average boater to throw his hands in the air and ask in exasperation, "What's a guy gotta do to get a boat around here?"

Fear not; there are still boats to be had that can put you on the water without obliterating your bottom line. In fact, here are six fun, great boats that cost less than \$20,000. One of them might do the job for you.





- LOA: 16'11" ► Beam: 6'4"
- Draft: 3" (drive up)
- Displacement: 1,125 lb.
- Fuel Capacity: 19 gal.
- Max Horsepower: 75

## → SPORTY BOATING Glastron GT160

The classic 16-foot bowrider is a staple of American boating. Glastron is one of the few builders to still offer an entry-level runabout of this size. The beauty of it is you can own a sporty little boat that seats six passengers without needing a mega SUV to tow it to the water. It costs less than \$20,000 with a 75 hp Evinrude E-TEC outboard and a trailer. Check Glastron's website for special deals that it runs periodically that could net a lower price with a different power package.

With the 75 hp E-TEC, the boat hit a top speed of 36.2 mph and climbed onto plane in 4.5 seconds. With the small 12-gallon fuel tank, the GT160 has a max range of 75 miles when running at an approximately 20 mph cruise speed. That's more than enough for a few hours at the lake, whether taking the kids tubing or skiing or just cruising around carving sporty S-curves.

What you get with the GT160 is a classic runabout layout, with twin bucket seats protected behind a full raked windshield and a bench running along

the transom that seats three. Two can lounge in the bow cockpit. The swim steps to either side of the motorwell are large for a boat of this size, allowing for decent water access for tow sports. A ski pylon raises the tow rope above the outboard. The steps have nonslip padding, and there's a two-step swim ladder on the starboard side. An insole ski locker hides the toys. While it's good for tow sports, the standard two-tone gelcoat package also gives it a sporty look, like all those memorable classic runabouts of our youth.



- LOA: 16'11" ► Beam: 8'1"
- Draft: 3'0" (drive down)
- Displacement: 1,235 lb.
- Fuel Capacity: 21.1 gal.
- Max Horsepower: 135





## SALTWATER FISHING

### Carolina Skiff 17 DLX

Who's ready to go fishing? Carolina Skiff has been building inexpensive fiberglass hulls designed to get anglers into the salt for decades. We've seen dealer specials on the Internet that state the 17 DLX can be had for \$16,300 with a Mercury 50 hp FourStroke plus a galvanized trailer.

The 17 DLX features Carolina Skiff's well-known, flat-bottom hull design, which gives the boat excellent stability at rest as well as improves efficiency while running on plane in calm seas.

The drawback is that flat-bottom skiffs tend to pound in chop and heavy seas, sometimes causing a wet, uncomfortable ride — although the boat comes standard with Smart Tabs to improve the overall ride. The upside is a spacious and stable fishing platform that is easy to maintain and clean. Basically a “wash and go” boat, it makes ownership not only economical but time-thrifty too. Another advantage these flat-bottom skiffs enjoy is the ability to float in shallow water. While we list the draft at 3 feet with the engine's drive down, it can float in around

1 foot of water when the engine is tilted above the hull bottom.

The 17 DLX is a center-console model with large casting platforms in the bow and at the transom. An adjustable backrest and cushion seat turn the cooler into a leaning post for the helm. An 18-gallon livewell comes standard. You can select from several options to make the boat even fishier, including rod holders and a raw-water washdown. The console has plenty of room for mounting electronics, and there's an option to add a trolling motor rig to the bow.



► LOA: 16'6" ► Beam: 7'0" ► Draft: 2'6" (drive down) ► Displacement: 1,900 lb. ► Fuel Capacity: 12 gal. ► Max Horsepower: 115



## FRESHWATER FISHING

### Tracker Pro Guide V-175 SC

With its lightweight aluminum hull, the Tracker Pro Guide V-175 SC can be towed with a modest vehicle. It can be had with a 90 hp Mercury FourStroke outboard and a trailer for less than \$20,000, giving you a stable, multipurpose freshwater fishing platform.

The V-175 SC has a steep 20-degree deadrise at the transom, which helps it handle rougher water more admirably than other boats of similar length overall. Welded reverse chines also help. On the

inside, it has a vinyl floor in the cockpit and marine-grade carpet on the casting platforms. The helm is located at a side console, typical for aluminum boats in this category. The deeper freeboard in the cockpit keeps passengers well protected underway, though the windscreen on the console doesn't offer much protection from the elements.

Fishing features? Tracker packs a ton into this smaller package. The boat comes standard with a Lowrance Elite-3x color fish finder, two movable, fold-down fishing chairs that fit in any

of six pedestal locations, three lockable rod boxes for 8-foot rods, straps to hold rigged rods in place on deck, a 29-gallon livewell aft and a 19-gallon livewell in the bow. The bow is rigged to mount a trolling motor, and the boat comes standard with a Minn Kota PowerDrive motor, capable of 55 pounds of thrust, with a foot pedal and a 54-inch shaft. All of this adds up to a boat you can trailer to any lake behind any vehicle and fish for any species that catches your fancy — from largemouth and smallmouth bass to pike and muskie to walleye.





**\$18,499**

benningtonmarine.com

- LOA: 20'5" ► Beam: 8'6"
- Draft: 3'0" (drive down)
- Displacement: 1,723 lb.
- Fuel Capacity: 21.4 gal.
- Max Horsepower: 70



## FAMILY FUN

### Bayliner Element XL

Bayliner first introduced the Element with the idea that the price of admission to recreational boating had become too steep for first-timers looking to test the waters. The original Element is a 16-foot boat with a 60 hp outboard designed to entertain a family of four on the water at the cost of most people's monthly cellphone bill. With its simplicity, stability and affordability, the Element has become a popular choice for a first boat. Some of that boat's limiting factors,

though, are size, range and horsepower.

Enter the Element XL, which stretches the length overall (LOA) from 16 to 18 feet and bumps the standard engine from a 60 hp to a 90 hp Mercury FourStroke outboard. Fuel capacity? Adding an additional six-gallon tank adds only \$200 to the sticker price while keeping the boat well under \$20,000. (A trailer still comes standard.)

The key to the Element is its trademark M-hull, which resembles a trimaran or even an old cathedral hull, with the V running down the centerline

and two V-shaped sponsons outboard with hard chines. But instead of tapering flat aft, the sponsons maintain their V all the way to the stern. Rather than tapering to a point in the bow, the line of the deck carries forward to a rounded bow, allowing Bayliner to maximize interior space. The helm is set in a side console and all the seating on top of molded fiberglass components. The Element XL is simple to own and operate as well as to clean and maintain. With the XL, Bayliner maintained affordability while hitting the sweet spot.



**\$14,899**

sea-doo.com

- LOA: 10'6" ► Beam: 4'3" ► Draft: N/A (not much)
- Displacement: 835 lb.
- Fuel Capacity: 15.9 gal.
- Max Horsepower: 260





## ENTERTAINING Bennington 20 SL

Bennington is the largest builder of pontoon boats in the United States, and while it has a mahogany edition 2575 QCW that has a six-figure price tag, it also offers pontoons that are more affordable. Bennington offers the 20 SL with a 50 hp Yamaha for less than \$20,000 that still meets the pontoon boat mission of providing plenty of space for relaxing and entertaining on the water.

The standard configuration with twin 23-inch tubes holds up to eight

passengers. The crew can spread out along the opposing chaise lounges forward — a full couch to starboard and a love seat to port that accommodates the side boarding gate. Additional gates at the bow and transom make this boat accessible from anywhere. An L-shaped bench sits opposite the helm console, and a kidney-shaped cockpit table mounts in a pedestal to aid in entertaining while on the water.

The large vinyl-covered swim platform outside the fencing is a highlight, providing tremendous water access via

the ladder mounted to starboard. A high-grade marine carpet covers the interior floor. A Sony GT Series stereo system comes standard for cranking tunes.

While there's no mahogany, the 20 SL shows plenty of evidence of quality construction, including 6-inch stainless-steel cleats — something not always found aboard pontoons. The standard Bimini top is easy to deploy. And it should be noted that the 24-gallon fuel tank (with a listed usable capacity of 21.4 gallons) provides this boat with plenty of range to cruise the local lake all day long.



- ▶ LOA: 18'2" ▶ Beam: 7'5"
- ▶ Draft: 3'0" (drive down)
- ▶ Displacement: 2,000 lb.
- ▶ Fuel Capacity: 12 gal.
- ▶ Max Horsepower: 115



## SPEED THRILLS Sea-Doo RXP-X 260

How many boats do you see listed in this magazine that break 50 mph? How many hit the 60 mph mark? And how many boats do you see able to hit 65 mph and still cost under \$20,000? The list gets exponentially shorter until you're left with the Sea-Doo RXP-X 260, a performance personal watercraft (PWC) that epitomizes the idea of cheap thrills.

That's not to say the RXP-X 260 is built cheap. It's a high-quality PWC made to be a high performer. It sports a central

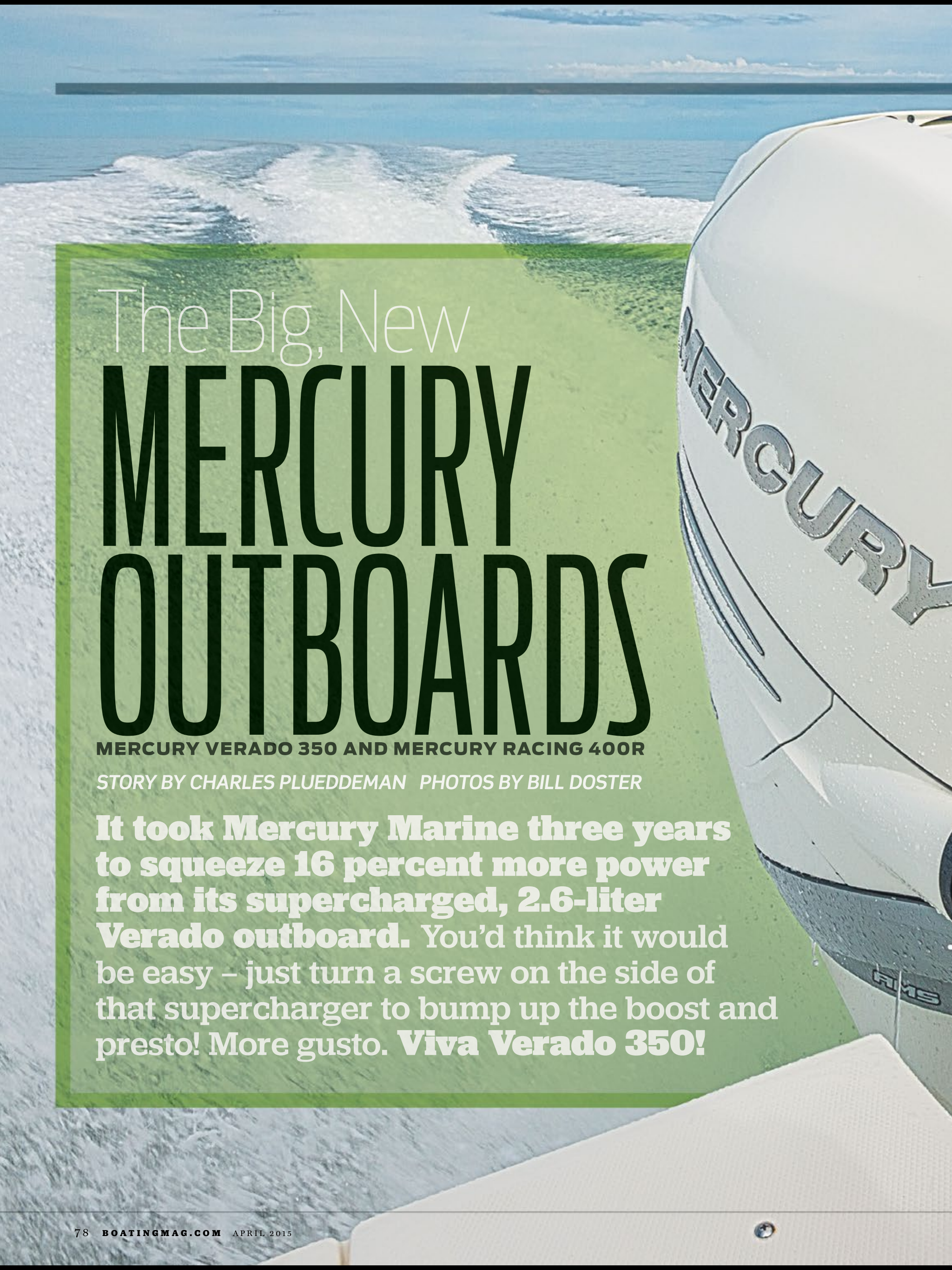
running pad, dropped and lowered from the soft and rounded chines. Aggressive adjustable sponsons, sporting 90-degree winglets, lock it into position while carving turns. The whole package, added up, provides what our expert PWC tester, Jeff Hemmel, called the tightest-cornering production PWC he's tested. In his words, "All I wanted to do was turn and burn."

The RXP-X 260 features Sea-Doo's intelligent brake and reverse (iBR) system, which allows for a neutral start at the dock and shifts into forward or

reverse via handlebar controls. Underway it uses a computer-controlled, modified reverse bucket to redirect forward thrust as a breaking system, which means you can quickly and safely bring it down from high speeds.

The built-in safety feature provides comfort while rocketing to over 67 mph flat out or executing incredibly tight turns at speeds in excess of 30 mph. The only drawback, compared with a traditional boat, is that it's a two-seater. Still invite your closest friend or family member and warn to hang on.





# The Big, New MERCURY OUTBOARDS

MERCURY VERADO 350 AND MERCURY RACING 400R

STORY BY CHARLES PLUEDDEMAN PHOTOS BY BILL DOSTER

**It took Mercury Marine three years to squeeze 16 percent more power from its supercharged, 2.6-liter Verado outboard.** You'd think it would be easy – just turn a screw on the side of that supercharger to bump up the boost and presto! More gusto. **Viva Verado 350!**









## Supercharge

To supply a charge to the intake of (as an engine) at a pressure higher than that of the surrounding atmosphere

SOURCE: MERRIAM-WEBSTER DICTIONARY

Alas, wringing 350 ponies out of a Verado and ensuring that it's consumer friendly, as opposed to the race-intended Verado 350 SCi, are not that simple. Remember that this powertrain is entering its second decade of production and that the engine was originally designed to make 275 maximum horsepower. I mean, you want it to run all day on 89-octane fuel and have a three-year warranty and get you and your big rig to the Bahamas and back once a month, right? So three years was the time it took to tune up the motor and then to test it to death. The result could be the

Contributing editor Charles Plueddeman puts the new Mercury outboards through trials.

apogee of Verado, because I don't think Merc can take this motor further and sell it with a standard warranty.

In addition to the new Verado, which we ran and tested aboard a Boston Whaler 370 Outrage, Mercury is introducing a 400 hp outboard under the Mercury Racing marque and a sterndrive, the Mercury Racing 1550 with dual fuel capability. This last engine can run as a 1,350 hp motor or as a 1,550, depending upon the fuel and by using a supplied fob to remap the ECU.

The world needs a Verado 350 because it already has a Verado 300. And maybe because Yamaha offers the F350. Offshore battlewagons rigged with quad Verado 300 motors could run triple Verado 350s and save a load of weight and dough with acceptable performance. Of course the more likely scenario is strapping quad 350s on the same boat. Because this is America, damn it. But think harder about the big-motor market. Imagine the savings in weight, rigging, fuel and maintenance to be

**THE FIRST STEP IN TUNING THE VERADO UP FROM 300 TO 350 HORSEPOWER WAS IN FACT RAISING THE BOOST PRESSURE OF THE SUPERCHARGER BY 6 PERCENT.**



gained by running a midsize center-console with a single Verado 350 instead of today's common twin 200 motors. Pontooners already running a 300 are begging for more power. Bay boaters and walleye anglers currently stuck at 300 horsepower will gladly order a 350 if the weight is manageable.

Of course 350 horsepower was beyond the mission of the Verado team when the motor debuted in 2004. Bumping the Verado 275 to 300 was one thing. Reaching 350 was more of a leap.

"The challenge was not in simply making the power from our 2.6-liter [156 cid] architecture," said Mercury product integration manager Chris Chapman, who led the project and was at the helm for our test of the new motor. "The challenge was to make that power on regular-grade fuel, with durability acceptable to the consumer and the same warranty we offer with other Mercury outboards. We've reached a high level of power density. Beyond this it gets pretty exotic."

The first step in tuning the Verado up to 350 horsepower was in fact improving airflow into the combustion chambers and raising the supercharger boost pressure by 6 percent, and mass airflow by 10 percent. Increasing the intake air pressure also raises its temperature, which is why the Verado 350 has a new liquid-cooled supercharger — to cool the air exiting the supercharger and thus raise its density before it enters the charge-air cooler.

To take best advantage of the increased charge pressure, the Verado 350 has specific camshaft profiles, valves and valve springs, and a reshaped cylinder head. A new, molded flywheel cover is perforated to



## HOW THEY DID IT

- ➔ Boost-pressure increase of 6 percent
- ➔ New liquid-cooled supercharger
- ➔ New camshaft profile
- ➔ New valves
- ➔ New, reshaped cylinder head
- ➔ New ventilated flywheel cover
- ➔ New intake snorkel
- ➔ Elimination of onboard fuel filter



In durability testing, the Verado 350 was required to survive 300 hours under load at wide-open throttle — 300 hours at 6,400 rpm — in a stainless-steel tank in the attic of the engineering lab in Fond du Lac, Wisconsin, and a season of beating on the open ocean at the hands of hard-as-nails test drivers.

**300**  
HOURS AT  
**6,400**  
RPM

better vent heat away from the powerhead below and lower overall temperature under the cowl. A new intake snorkel snakes over the top of the powerhead with its opening positioned close to the air induction port on the back of the cowl to capture the coolest air possible. Finally, the fuel filter under the cowl was removed to eliminate the possibility of vapor lock occurring in extreme conditions. Mercury points out that most of its Verado customers are already rigging remote filters anyway.

The Verado 350 is fitted with the 5.44-inch-diameter “HD” gear case with 1.75:1 gears and a 1.25-inch prop shaft. Props up to 16 inches in diameter fit this case, including the Enertia ECO prop. The case is painted silver because it looks faster. The Verado 350 is also equipped with race-style guide plates to stabilize the engine and improve handling at high speeds. This motor mounts on 26-inch centers and will be offered in 20-, 25- and 30-inch lengths, in classic Phantom Black and in two tones

of white: Cold Fusion and Warm Fusion. Dry weight ranges from 668 pounds to 695 pounds, or about 21 pounds more than a Verado 300. The other outboard in this class, the 5.3-liter Yamaha F350, weighs 763 pounds with a 25-inch shaft, or 81 pounds more than a similar Verado 350. The V-8 Yamaha F350 also requires wider, 28.6-inch mounting centers.

All other Verado features are retained on the 350, including the vibration-damping Advanced Mid Section (AMS) with perimeter mounts, electrohydraulic power steering, SmartCraft Digital Throttle & Shift and optional Joystick Piloting for dual, triple and quad rigs, which includes the popular Skyhook boat-holding feature. All Verado 350 motors are equipped with the idle charge system, a feature that electronically raises engine idle rpm to boost the charging output by 9 amps when it senses low battery voltage. Merc says

## Mercury Racing Verado 400R

The new Mercury Racing Verado 400R is a potent replacement for the Mercury Racing Verado 350 SCi outboard. This new 400 hp outboard is a screamer — wide-open throttle range is 6,400 to 7,000 rpm — aimed at owners who put performance first. Displacement remains 2.6 liters, and powerhead components are similar to those developed for the Verado 350, including the water-cooled supercharger and the molded intake snorkel. Gone is the “ram air” cowl used on the 350 SCi. The 400R uses a standard Verado cowl with racing graphics that’s more practical offshore and quieter than the 350 SCi. More good news is that the 400R will run on 89-octane fuel, thanks to a sophisticated new knock sensor it shares with the Verado 350. Mercury Racing says that feeding the 400R 91-octane gas, however, may be the best way to extract peak power in some conditions. The 400R is also available with optional joystick control when equipped with the Sport Master cambered-skeg gear case. The joystick was not offered at all on the 350 SCi.

Gear-case options include the 5.44-inch Verado HD 1.75:1 case or the Sport Master with either a straight or cambered skeg. The crescent-shaped Sport Master case is designed for speeds over 85 mph and features dual

water pickups. The cambered skeg compensates for side torque in some applications. Merc says the addition of the Sport Master option will make this motor more attractive to high-speed catamaran rigs. Mercury Racing has also developed a heavy-duty tie bar for this engine.

The 400R will be offered in 20-, 25- and 30-inch shaft lengths, in right and left rotations, affording boaters a multitude of rigging options and performance targets. For single-engine applications, a cambered Sport Master without a joystick is available in 20- and 25-inch lengths and right-hand rotation only. The lightest version of the 400R — 20-inch length with the 5.44-inch HD gear case — weighs 668 pounds, according to Mercury, the same as the Verado 350.

Big power carries a big price: Manufacturer’s suggested retail price for the Verado 400R ranges from \$31,530 to \$36,120 with a two-year warranty. Color options are Phantom Black and Cold Fusion White with blue Merc Racing graphics. Blue accent stripes will be shipped with the motor but not applied, and accent stripes will also be offered in six alternative colors (sold separately) to allow the owner to custom-match a boat. Merc says application is an easy DIY task. Shipments of the Mercury Racing 400R will begin in early March. — C.P.







**Boston Whaler's 370 Outrage proved a perfect test platform** for us to use to test the new Mercury Verado 350 outboard engine. With its deep-V hull, robust construction and unsinkability, the 370 Outrage packs the capability of traversing hundreds of miles of blue water in the quest for game fish. Lots of power and lots of reliability are requisites to those pursuits.

#### ▼ BOATING Certified Test Results

SPEED			EFFICIENCY				OPERATION		
rpm	knots	mph	gph	naut. mpg	stat. mpg	n. mi. range	s. mi. range	angle	sound level
1000	7.99	9.20	3.85	2.08	2.39	748	860	1	66
1500	10.60	12.20	6.20	1.71	1.97	616	708	2	71
2000	11.64	13.40	10.70	1.09	1.25	392	451	3	75
2500	12.77	14.70	16.50	0.77	0.89	279	321	5	77
3000	15.03	17.30	24.30	0.62	0.71	223	256	7	81
3500	23.81	27.40	29.00	0.82	0.94	296	340	5	82
4000	29.89	34.40	34.20	0.87	1.01	315	362	5	84
4500	34.85	40.10	41.30	0.84	0.97	304	350	5	85
5000	40.58	46.70	54.80	0.74	0.85	267	307	4	86
5500	42.60	49.00	65.30	0.65	0.75	235	270	4	87
6000	47.19	54.30	91.40	0.52	0.59	186	214	4	89
6200	48.23	55.50	91.60	0.53	0.61	190	218	4	89

MOST ECONOMICAL CRUISING SPEED

►LOA: 37'6" ►Beam: 11'6" ►Draft: 1'11.5" ►Displacement: 13,500 lb. (dry, no power) ►Transom Deadrise: 23.5 degrees ►Bridge Clearance: 9'0" ►Fuel Capacity: 425 gal. ►Max Horsepower: 1,050 ►Available Power: Triple Mercury outboards up to 1,050 hp total

**Price: \$471,884** (with test power)

#### HOW WE TESTED

**ENGINES:** Triple 350 hp Mercury Verado outboards  
**PROPS:** Revolution 4 14 $\frac{1}{2}$ " x 19" 4-blade stainless steel; Revolution 4 14 $\frac{1}{2}$ " x 20" 4-blade stainless steel (center engine) **GEAR RATIO:** 1.75:1 **FUEL LOAD:** 210 gal. **CREW WEIGHT:** 770 lb.

that, as with the Verado 300, 91-octane fuel is preferred but 89 is acceptable.

The Verado 350 will have a suggested retail price of \$27,505, in a 20-inch shaft length, or \$3,210 more than the Verado 300. A Yamaha F350 starts at \$30,685. Builders will determine the price on factory-rigged boats. Whaler says the 370 Outrage with triple Verado 350 motors will cost \$13,881 more than the same boat with triple 300 motors. What that gets you is hard to determine exactly — your results may vary, as they say. During our test, top speed peaked at 55.5 mph on multiple runs on a flat-calm Atlantic, compared with 54.7 mph reported on the Whaler performance bulletin for the 370 Outrage with triple Verado 300 outboards, the same props and a similar fuel load. Merc adds that the performance gain should be greater, up to 5 mph in top speed, on lighter boats and those that respond well to transom lift. Cruising speed and fuel economy seem to be about the same for the triple 350 and triple 300 rigs. Zero to 30 mph came up in a respectable 8.3

seconds with the triple 350 motors. The supercharged Verado midrange poke — for my money, still the best kick in the backside my outboard money can buy — remains undiminished, very entertaining and also useful when sea conditions call for power on the uphill side of a big swell.

If 3 to 5 mph more speed seems like a modest gain given the added cost, then you are not a customer for these motors. If squeezing all the potential from your boat really matters, Merc just gave you a way to squeeze a little harder. ⚓

## ECO Prop:

Mercury developed a new propeller series for 2015 too. The ECO prop was designed with input from anglers seeking increased fuel economy. During our testing, which you can read

about in the March issue of *Boating*, the ECO prop improved fuel economy by more than 20 percent.



SPECIFICATIONS	VERADO 300	VERADO 350	YAMAHA F350
DISPLACEMENT(L/CID)	2.6/158.6	2.6/158.6	5.3/325.3
SHAFT LENGTHS (IN.)	20, 25, 30	20, 25, 30	25, 30
WEIGHT (LB.)	638	668	763
CYLINDERS	Inline-6	Inline-6	V-8
PRICE (BASE)	\$24,295	\$27,505	\$30,685



Environmental benefits  
aside, a different kind of  
green may fuel the switch to  
electric planing powerboats.



PHOTO: CAPT. VINCENT DANIELLO



# All Hail the Green Machine

By Capt. Vincent Daniello

## Electric motors and battery capacity will exceed the horsepower and range of gas engines and a tank full of fuel.

When that happens, internal combustion engines may vanish as quickly as a stack of \$20s at the gas dock. How soon will that happen? Likely before first-graders today are ready to buy their first boat, and possibly before they're in college.

Says who? We went aboard electric boats and talked to industry insiders for the scoop on electric boating's future. Come aboard as we explore 100 years of electric boat development.

### In the Beginning

"Over a period of 30 years, boats went through five different methods of propulsion: steam, naphtha, electric, gasoline and diesel," exclaims Joseph Fleming, the head of engineering for Elco, builders of electric boats and propulsion systems. But practical, safe motorboating began at the 1893 Chicago World's Fair, where 55 electric launches ferried attendees. The fair was the first-ever large-scale use of electricity. "At the time, electric boats

were most practical," Fleming says.

Consider *Wenona*, a 32-foot launch built in 1899 by the Electric Launch Co. — now Elco — the company that built those World's Fair launches. A 5 hp electric motor pushed *Wenona* at 7 mph for more than 60 miles between charges without smoke, soot, noise or open flame.

What happened to electric-powered boats? Gottlieb Daimler invented the high-speed gasoline engine, which he used in



1893 Elco electric launch

1886 to propel a 15-foot skiff along at 7 mph — the first gas-powered boat, and Rudolf Diesel ran his first successful

prototype engine in 1893. "By the end of World War I, gasoline engines became the preferred propulsion for boats," Fleming says. At the time, boats could go faster and farther on liquid fuel than they could on batteries.

A century later, the tide may be swinging away from fuel. Elco recently restored a 34-foot 1941 Cruisette. When built, the original 125 hp Chrysler gasoline engine pushed *Green Machine* to 16 mph, and now the new



70-horsepower-equivalent Elco electric motor's practical cruising speed is 8 mph — clearly not performance that lands a boat on the cover of *Boating*. However, some motors on Elco's drawing board can exceed *Green Machine's* original gas engine's performance. What's the holdup? Batteries. Fleming calculates the boat would go 9.4 miles at 16 mph using her bank of 18 24-amp-hour, absorbed glass mat (AGM) batteries.

## Power to the People

"We reached the capacity of lead-acid technology 50 years ago," says Daan Hobbelen, who heads the power storage labs at Mastervolt, makers of marine batteries, chargers, inverters and propulsion systems. "We can make lead-acid better for starting, better for storage, lower maintenance, but there isn't much we can do to add power density." Lithium iron phosphate (LiFePO<sub>4</sub>), currently the best alternative, more than doubles *Green Machine's* range to 20.4 miles using batteries weighing the same as her existing

AGM batteries. "Production improvements should increase energy density another 40 percent, and the cost will come down," Hobbelen says.

Lithium sulfur (Li-S) is the upcoming battery

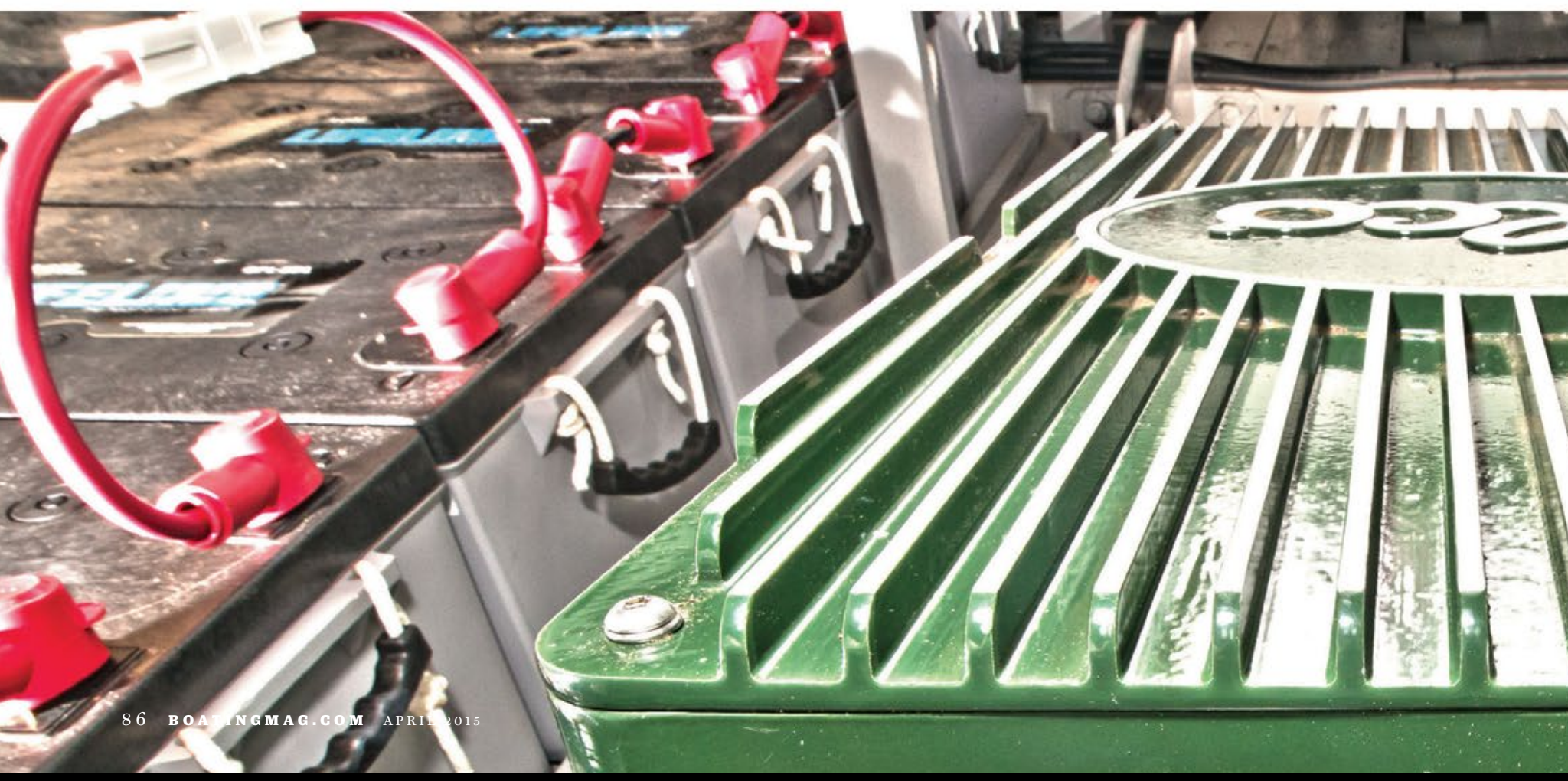
technology, currently with about double the energy density of LiFePO<sub>4</sub>. Hobbelen expects cost-effective production within five years, and he anticipates double that capacity — four times today's best lithium batteries — in 10 years. That would extend *Green Machine's* 16 mph range past 80 miles.

Five hours of cruising time clearly isn't acceptable, but just as diesel engines became lighter — 50 percent more horsepower per pound just in the past 20 years — electric

motors will be lighter too. "We can hit one horsepower per pound," Fleming says. *Green Machine's* existing Elco motor weighs 10 times that. (Modern diesels average 1.5 pounds per horsepower.) Increased horsepower for the same weight motor allows boats to carry more batteries, extending range, increasing speed or both. Doubling the weight of *Green Machine's* batteries requires just 20 percent more horsepower to maintain performance, so with expected battery technology, in 10 years that



*Green Machine* (background) and *Wenona* cruise Lake George using electric power.





# DOUBLING THE WEIGHT OF *GREEN MACHINE*'S BATTERIES REQUIRES JUST 20 PERCENT MORE HORSEPOWER TO MAINTAIN PERFORMANCE, SO WITH EXPECTED BATTERY TECHNOLOGY IN 10 YEARS, THAT SHOULD BE A 160-MILE RANGE ABOARD A 34-FOOT BOAT CRUISING 16 MPH.

should be a 160-mile range aboard a 34-foot boat cruising at 16 mph.

Admittedly, 16 mph won't cut it for many boaters. How about 120 mph? Cigarette's 38 Top Gun powered by Mercedes AMG electric propulsion makes 2,220 horsepower. Four behemoth, liquid-cooled lithium-ion batteries provide the boat with 240 kilowatt-hours of storage — the equivalent of a 5 kW generator running for 48 hours. But the boat's range would be more easily calculated with a stopwatch than a GPS — 7.3 minutes for 14.6 miles at 120 mph.

Even lithium sulfur leaves an electric Top Gun's range at less than 50 miles — 25 percent of

the 200-mile wide-open-throttle range at 85 mph of a gas-powered 38 Top Gun. What closes the gap? "Lithium air promises about 10 times the energy of lithium batteries we have today," says Christoph Ballin, who co-founded Torqeedo, pioneering maker of electric marine motors. "Once that can be produced economically, electric propulsion will take hold as quickly as digital cameras took over film."

Lithium-air (Li-air) batteries are already being produced in small numbers, and electric propulsion technology is progressing quickly. "When we started Torqeedo in 2005, there wasn't a single electric

outboard using brushless motors or a single lithium battery being used," Ballin says. Before that, pontoon boats and restored classic runabouts on "green" lakes in Europe and the United States were propelled by electric trolling motors. "Their overall efficiency is 15 or 20 percent," he states. "We're currently at 56 percent overall efficiency," Ballin says, with most of those losses in the propeller and lower unit. Today's electric motors use 98 percent of power consumed to turn the shaft, and that efficiency holds over most of their operating rpm range. Even the century-old *Wenona* applies 80 percent of its battery



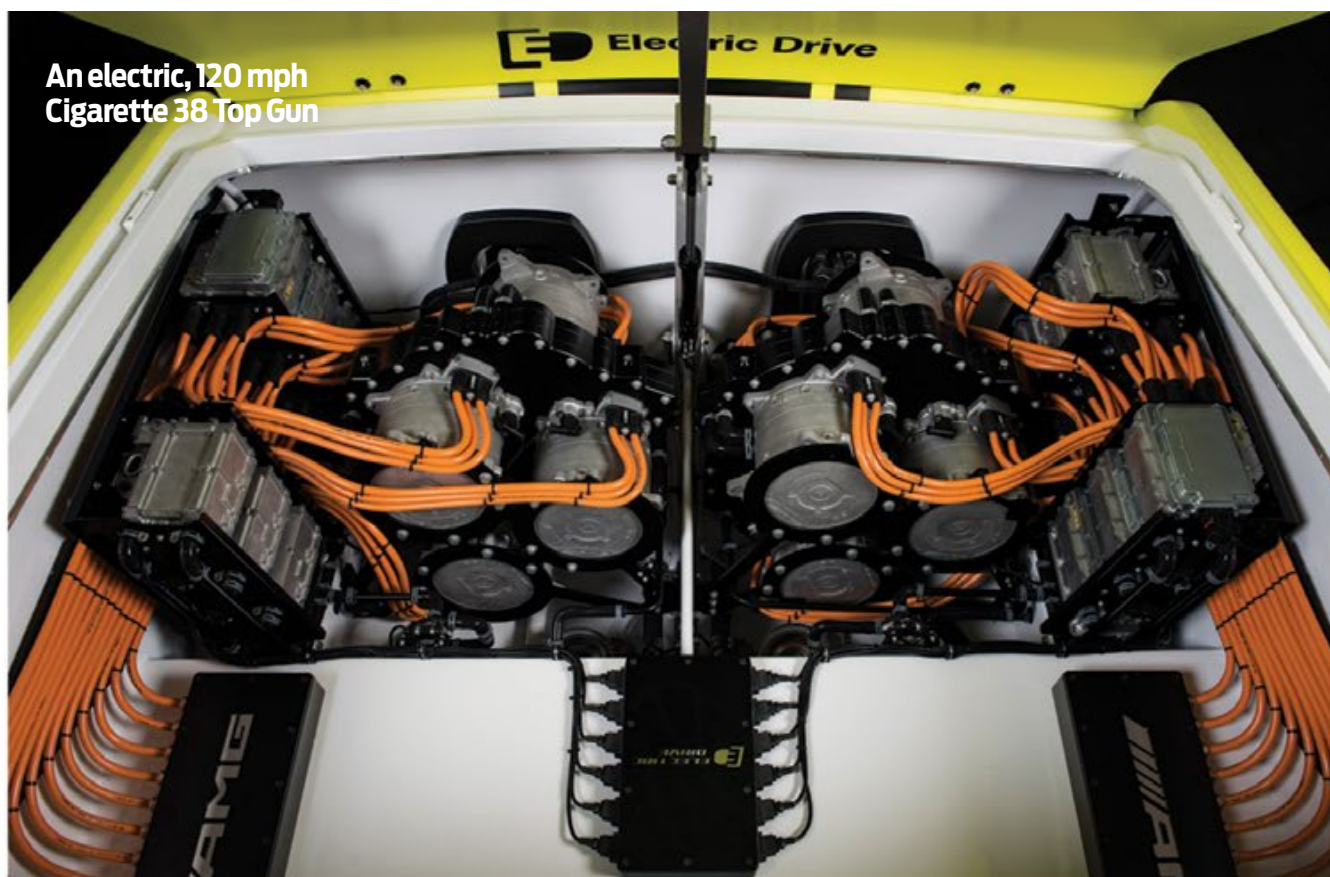
## BATTERY LIFE

When AGM batteries discharge below 50 percent, or lithium batteries draw below 20 percent, battery life suffers. But boaters routinely run expensive diesel engines above 80 percent load knowing that the engines would last longer if run slower, and that fuel costs per mile go up with increased speed. Drawing AGM batteries to just 20 percent remaining charge or lithium to 10 percent charge is an analogous cost trade-off that most boaters will likely accept. — V.F.D.

*Green Machine's 70 hp electric motor and 18 AGM batteries*







An electric, 120 mph Cigarette 38 Top Gun

power to the propeller shaft. Gasoline engines today are around 25 percent efficient before drive and propeller losses, though liquid fuel's greater power density — the energy it packs into a given volume — still makes up for

that over batteries. Electric motors are projected to be much smaller than gas engines too — an outboard of the future won't be much larger than a lower unit today. Motors contained belowdecks free cockpit space, and pods might contain the motors completely within their lower units, freeing space below.

### Cost Benefit Analysis

Even the high price of current lithium batteries

may favor electric boats, say the experts. "Calendar life of lithium batteries is 20 years," Hobbelen says, compared with about five years for AGM. "If you compare life cycles, AGM can expect 500 cycles at 50 percent discharge. Lithium ion exceeds 2,000 cycles at 80 percent discharge. Cost over a battery's kilowatt-hours during its life is lower on lithium than it is with AGM."

What about charging time? "From 95 percent state of charge down to

about 10 percent, lithium produces a very constant chemical reaction," Hobbelen says, which means little lost to heat, even under high power demand. Conversely, Hobbelen adds, "You can charge a bank of lithium batteries to 95 percent of full charge in about 20 minutes." The 440 volts required is readily available on streetside power poles. "The automobile industry is facing similar rapid-charging issues," Hobbelen says. "It's likely marinas will use those automotive solutions." The American Boat and Yacht Council (ABYC) is already contemplating safety standards for 400-volt DC systems that will drive and charge electric boats.

Maintenance might be another nail in the gas-engine coffin. When refurbished three years ago, *Wenona's* original, 116-year-old electric motor needed little work. Elco claims 50,000 hours essentially maintenance-free from its current, three-phase, alternating current motors. Torqeedo claims about the same for its brushless DC system. Of the limiting factor, Ballin says: "The electronics that control the motor will be able to start and stop maybe 50,000 times," far outlasting most boats. High-voltage, incredibly high-amperage DC systems do require vigilance, though. "Have the system inspected every two years or 200 hours," Ballin advises.



Beneteau Swift Trawler 34 cruises with an Elco electric motor or with Cummins diesel power.



**BENETEAU SWIFT TRAWLER 34 HYBRID RUN TIME AND RANGE AT 5.7 MPH**

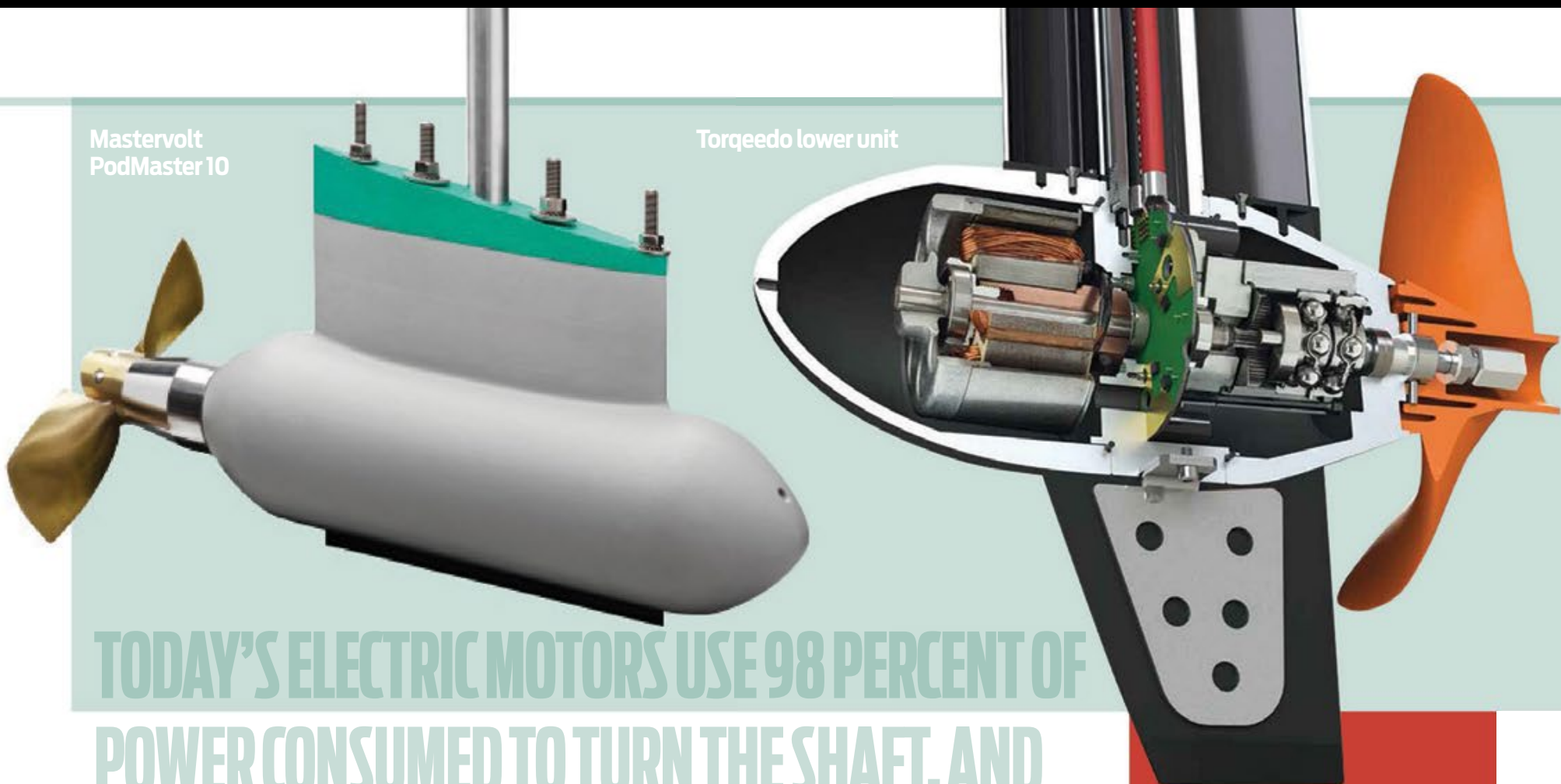


PHOTOS: (FROM TOP) COURTESY CIGARETTE RACING TEAM; COURTESY ELCO; COURTESY BENETEAU (2)



Mastervolt  
PodMaster 10

Torqueedo lower unit



## TODAY'S ELECTRIC MOTORS USE 98 PERCENT OF POWER CONSUMED TO TURN THE SHAFT, AND THAT EFFICIENCY HOLDS OVER MOST OF THEIR OPERATING RPM RANGE.

### MORE TORQUE AND NO TRANNY

Both Elco's three-phase, alternating-current motors and Torqueedo's brushless, direct-current motors are driven by an alternating-current magnetic field. Direct-current battery power goes through an inverter that varies AC frequency to regulate motor speed, with full torque down to 1 rpm, and also controls propeller direction, negating the need for marine transmissions. In older technology, brushed direct-current motor speed is varied by changing voltage, and power is physically carried through brushes to a commutator, which increases maintenance and decreases efficiency. — V.F.D.

### Switch Hitters

So where does that leave electric powerboats now? Parallel hybrids provide the means to go fast on internal combustion engines while using electric power for slow cruising. Serial hybrids extend electric-motor range using generators to charge batteries. Beneteau's prototype 34 Swift Trawler, *Current Affairs*, is actually both. The boat's standard 425 hp Cummins diesel inboard provides cruising at 20 mph, while an Elco 20 hp equivalent electric motor and 12 220-amp-hour

AGM batteries push the boat to 5.7 mph for 19 miles. What's more interesting is that, using about half the output of the boat's 7.5 kW generator, *Current Affairs* runs on electricity continuously, without depleting batteries, at 4.5 mph. Conversely, the diesel engine turning the electric motor provides 7.7 kW of alternating current using an inverter, providing redundant backup to the generator's electric output.

"Not just being green, but from an economic standpoint, there are a few

niches where pure electric propulsion makes sense, and others where hybrid makes sense," Ballin says. "With improvements in battery technology, more of these niches become practical." Ballin sees a task of our generation is to expand green mobility. "Without affecting our on-the-water activities, we need to make boating cleaner, make it nicer, make it sustainable," he says. But dollars — making boat propulsion less expensive — may drive that shift to green power as much as advances in battery technology. 📍

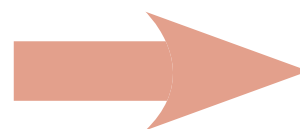
PHOTOS: (FROM TOP LEFT) COURTESY MASTERVOLT, COURTESY TORQUEEDO

Present Day: 1,716 pounds of **AGM** batteries: 3.3 hours and 18.6 miles

Present Day: 1,535 pounds of Mastervolt **LiFePO4** batteries: 7 hours and 39.9 miles

2020 Projected: 1,500 pounds of **Li-S** batteries: 12.9 hours and 73.3 miles

2030 Projected: 1,500 pounds of **Li-air**: 64.3 hours and 366.4 miles



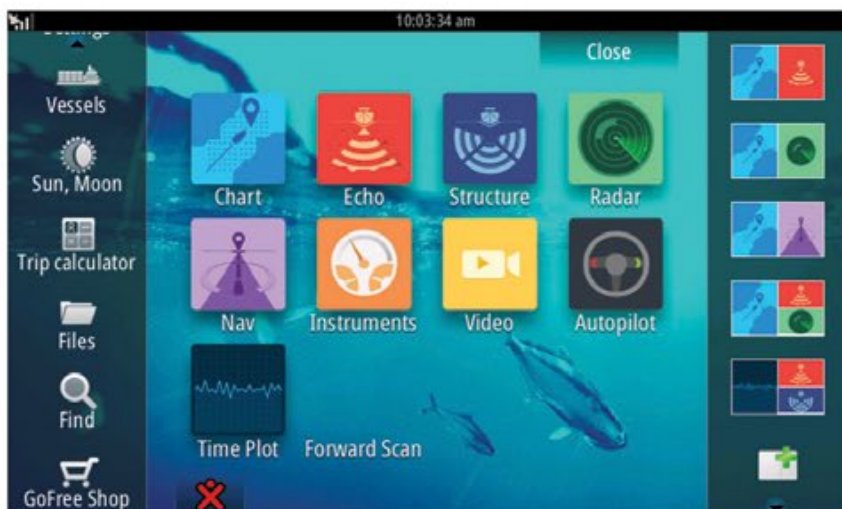
18.6 MILES   39.9 MILES   73.3 MILES

366.4 MILES



# Electronics

## GoFree Wireless Map and Mapping Service Store



**With Navico's latest firmware update on Simrad NSS evo2, NSO evo2 and Lowrance HDS displays, you can connect directly from your multifunction display (MFD) to the new GoFree store and buy charts from Navico, Navionics or Jeppesen C-Map for wherever you want to go. — Randy Vance**

Today BB-size Wi-Fi modules let us talk to the world, not just to nearby Wi-Fi-equipped smartphones or tablets. With the just-released GoFree app firmware for your Simrad NSS evo2 or NSO evo2 or Lowrance HDS display, you can also use this technology to ...

### *Cut the cord to brick and mortar.*

Bypass the annoying digital card you had to go to town to buy, or order and ship. You can do it as you leave port instead of sweating it out with a laptop and transferring the data on a card.

### *Upgrade firmware automatically.*

Power up your MFD and it will automatically poll GoFree for firmware updates, download them and activate them on your MFD network.

### *Make your own charts.*

Now you can do it wirelessly. In the old system, with Navionics and Navico's Insight Genesis, you had to load a data card into your MFD, set it to record sonar readings with integrated GPS position data and then plug the card into your Mac or PC, log in to your mapmaker's cloud server, upload the data and wait for it. Then you could download a new contour map to a data card and plug it into your MFD. Now, though, your MFD connects directly to the GoFree server when in Wi-Fi range, uploads the sonar map and grabs it when it's ready to go on your next trip.

GoFree is going to be pretty darn popular, and it gives boaters the most compelling reason ever to upgrade their electronics.

## Micro Pilots

There's a saying that an autopilot is an extra hand you don't have to feed. But up until recently, installing one was so onerous, the equipment so large, and the installation parameters so narrow that small boats — those under 30 feet — couldn't be bothered with it. That has all changed.

Miniature position sensors, heading sensors and accelerometers that have been hidden in smartphones for a decade are now incorporated into autopilot sensors about the size of a hockey puck. They're smart too, learning quickly what magnetic fields in a boat to ignore and how best to adapt steering input to current, winds and seas. They're so smart, in fact, that they don't mind if you mount them crooked, upside down, high or low, and they don't even need to be on the centerline.

Raymarine led this miniature march with its Evolution series (from \$1,599) autopilots. Lowrance followed with its Outboard Pilot, integrated with HDS Gen2 or Gen 3 Touch MFDs (from \$999). It controls both MotorGuide's Wi-Fi Xi5 electric motor and the outboard through the MFD. Simrad has a similar system, sans the electric motor capability — at least for now. Garmin's GHP 10 (from \$1,697) system's Shadow Drive lets you take over the helm by simply grabbing the wheel. — R.V.



## Ask Ken



**Q** What is the difference between an EPIRB (emergency position-indicating radio beacon) and a PLB (personal locator beacon)?

**A** EPIRBs and PLBs both can summon first-responder assistance when a serious emergency (eminent threat to life or vessel) occurs. An EPIRB (shown here) should be mounted where it can be quickly grabbed. Some deploy automatically when a vessel sinks. They have a 48-hour operation time, float upright and have a built-in strobe light to guide rescuers. PLBs are intended to be hand-held or worn on a life jacket or clothing. Operating time is 24 hours, not all models float, and PLBs must be held upright with the antenna in a vertical position. PLBs can also be used on land in remote locations. EPIRBs and PLBs both broadcast on 406 MHz to a rescue coordination center, which calls the rescue agency, such as the Coast Guard or sheriff's office.  
— Ken Englert



### ASK KEN ONLINE

For more exclusive electronics content, visit [boatingmag.com/askken](http://boatingmag.com/askken).

PHOTOS: (CLOCKWISE FROM TOP LEFT) COURTESY SIMRAD; CRAIG HASHIMOTO; COURTESY ACR; COURTESY RAYMARINE





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Seating 19, 20" draft

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# Short Casts



## Four Tips for Tuna Tanglers

Spreader bars create the illusion of terrified bait schooling for protection near the surface, luring predators up from the depths. They come in different varieties, shapes and colors employing shell squids, hard plastic lures, jet heads, rubber ballyhoo, bird “splash” bars and more. Bars are typically fabricated from stainless steel or titanium and measure from 30 to 48 inches in width, using three to five chains of teasers, with the last lure in the center chain lagging back from the pack, looking like easy prey – but this one has the hook in it. On your next trip offshore, bring some bars along. These four tips will get you into the game. – *Capt. John N. Raguso*

**1 THE MORE THE MERRIER** If one spreader bar looks like a pod of terrified baitfish, four to six bars in close proximity look like a mini migration. The more commotion you make on the

surface, the more likely you will bring up tuna and other predators from the thermocline down below.

**2 DREDGE THE DEPTHS** Spreader bars are an offshoot of the umbrella rigs, and dredges are next-generation spreader bars. Dredges take the multiple

teaser concept to the max, featuring four to six arms rigged with strings of squids or Mylar ballyhoo on each branch. A heavy weight or drill keeps these under the surface at 4 to 6 knots.

**3 HANG 'EM HIGH** Outriggers are the ideal launching

points for spreader bars, since the higher angle helps keep the bars from plowing into the waves. Use the strongest rigger clips that you can (I like Rupp Nok-Outs and Aftco Roller-Trollers) to keep max tension in rough seas but still allow a smooth release after the strike.

**4 MAGIC CARPET RIDE** The secret weapon for tournament anglers is a “carpet” or “meatball” bar that employs twice as many squids (25 to 30) as the “normal” bar that uses 15 (2-3-5-3-2) on its five branches. These are more challenging to deploy and require a separate leader man and gaffer to control a frenzied tuna at boatside, but the results can be extremely rewarding.



## Raymarine Dragonfly 4 CHIRP

The 4.3-inch Dragonfly 4 DV uses wide-spectrum CHIRP DownVision sonar to give anglers photolike images of fish and underwater objects. \$200; raymarine.com — K.F.

## NOAA HMS Permits: Register or Renew Now

If you want to catch tuna or a variety of other offshore Atlantic game fish, you are required to purchase a permit and carry it aboard. This federal law applies to all owners and operators of vessels fishing recreationally for and/or retaining regulated Highly Migratory



Species (Atlantic tunas, sharks, swordfish and billfish) in the Atlantic Ocean, including the Gulf of Mexico and the Caribbean Sea. They must obtain an Atlantic Highly Migratory Species (HMS) permit. The 2015 Atlantic HMS permit costs \$20 and will be valid from the date of issuance through Dec. 31, 2015. You can order your permit online at [hmspermits.noaa.gov](http://hmspermits.noaa.gov). — Kevin Falvey





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BY RANDY VANCE

## Handheld GPS vs. Tablets vs. Hard-Wired GPS

The market is changing for handheld GPS devices, thanks to tablets, phablets and newer, less expensive fixed-base GPS and sonar systems that fit easily on small boat helms. Still, there are boaters who on occasion need navigation on board and want to double their money with street and trail capabilities in one device. Sure, big-boat skippers should definitely have a handheld in their ditch bag. But what are the advantages and disadvantages of basic fixed-base and portable devices? And what about using an iPad? We took these devices to task to get their stories.

### GARMIN

GPSMAP 78sc

\$199.99

**SCREEN SIZE:** 2.6-inch diagonal

**TOUCH SCREEN:** No

**SONAR CAPABILITY:** No

**WATERPROOF:** IPX-7 and it floats.

**MEDIA PORT:** MicroSD

**POWERED BY:** Two AA batteries (20 hours)

**NAUTICAL CHARTS INCLUDED:** World marine and land base map with land and sea features

**OPTIONAL CHARTS AVAILABLE:** BlueChart g2 and LakeVü HD, City Navigator, various topographic maps

**DASH MOUNTS:** Optional adhesive marine mount

**SPECIAL FEATURES:** GLONASS Russian satellite capable; turn-by-turn capable with City Navigator; Custom Maps system converts paper maps into downloadable media GPS-ready — for instance, you can overlay historic maps over modern maps.

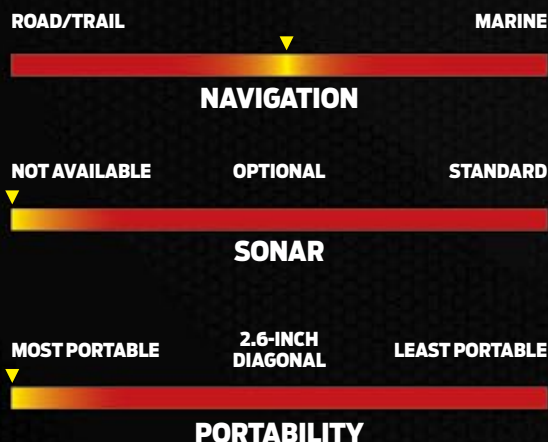


PHOTO: ZACH STOVALL



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## HOW WE TESTED

### POINTS OF COMPARISON

We looked at each device, noting its versatility and its specific appropriateness for marine use. Our experience tells us that the following criteria form a reliable yardstick to measure its capabilities.

**SONAR CAPABILITY:** Does the unit have a sonar on board, or can it be accessorized for sonar? New sonar devices can use Wi-Fi to display sonar on tablets or smartphones.

**NAUTICAL CHARTS INCLUDED:** All the handhelds have various charts available. Our test models had marine charts bundled with them.

**OPTIONAL CHARTS AVAILABLE:** The great benefit of a handheld device is its portability and versatility for applications besides marine use. Turn-by-turn highway maps are great benefits. We name the capabilities of our test models.

**ROAD AND TRAIL MAPS:** So many boaters enjoy the outdoors in many other ways including fishing, hiking and bike and auto touring. Detailed maps for these endeavors add to the units' value.

**DASH MOUNTS:** RAM Mounts makes many different dash and helm-station mounts for nearly every electrical device. It has devices for all of our tested gadgets. However, we preferred the custom fit of brand-specific mounts, like those with Garmin's Montana 600.

**SPECIAL FEATURES:** Having Wi-Fi interface means the device can transfer waypoints and trails wirelessly between devices. It's a handy way to share the fun and back up your waypoints to another device.

Only the Magellan had a camera on board, and it shoots fairly decent images too.

Turn-by-turn highway capabilities on these devices are fantastic if you don't want to use cellular data for navigating the highway.

### HOW WE SCORED

We've used slider bars indicating best applications for some navigating tools. On each bar, opposing criteria are on either end. In this tug of war, there are no winners; simply some products are better suited to some applications. However, we highly valued the floating portability seen in Garmin's GPSMAP 78sc.



## GARMIN

### Montana 600 Marine Bundle

\$499

**SCREEN SIZE:** 4.0-inch diagonal

**TOUCH SCREEN:** Yes

**SONAR CAPABILITY:** No

**WATERPROOF:** IPX-7

**MEDIA PORT:** MicroSD

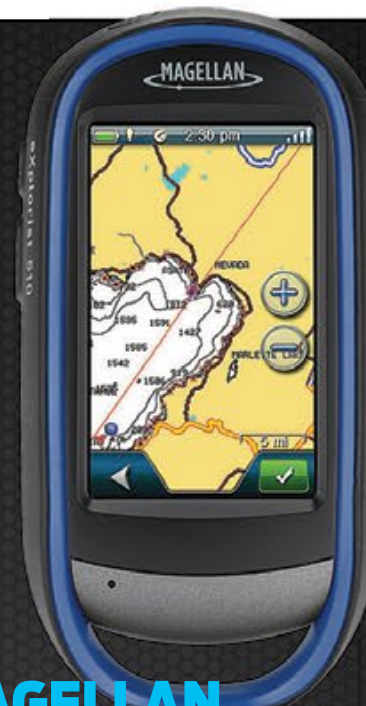
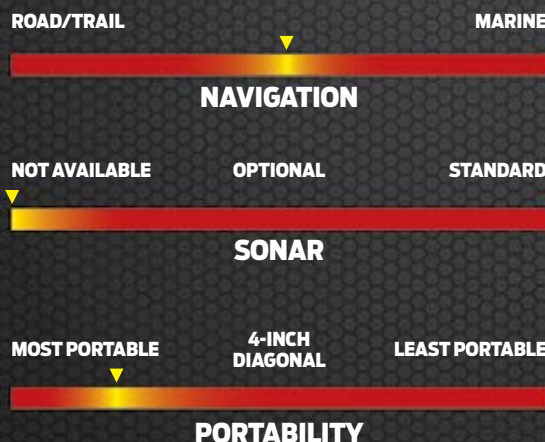
**POWERED BY:** Three AAs or one lithium-ion battery (included)

**NAUTICAL CHARTS INCLUDED:** BlueChart g2

**OPTIONAL CHARTS AVAILABLE:** City Navigator and various topo/trail maps

**DASH MOUNTS:** Standard

**SPECIAL FEATURES:** Add City Navigator maps for turn-by-turn highway navigation or topographic U.S. maps for hiking; Wi-Fi interface enables waypoint and trail sharing between compatible devices — can be used for trading fishing holes or hiking destinations; barometric gauge indicates precise altitude.



## MAGELLAN

### Explorist 510 Marine Edition

\$479

**SCREEN SIZE:** 3.0-inch diagonal

**TOUCH SCREEN:** Yes

**SONAR CAPABILITY:** No

**WATERPROOF:** IPX-7

**MEDIA PORT:** MicroSD

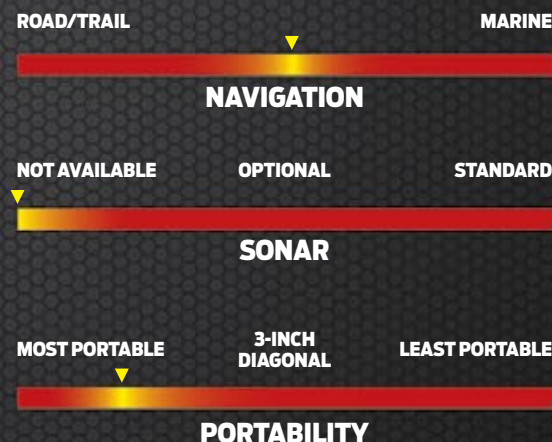
**POWERED BY:** Three AA batteries

**NAUTICAL CHARTS INCLUDED:** Navionics Gold SD card, comprehensive coastal and lakes for all anglers

**OPTIONAL CHARTS AVAILABLE:** City Navigator and various topo/trail maps

**DASH MOUNTS:** Aftermarket (rammount.com)

**SPECIAL FEATURES:** Magellan Communicator and cable (Mac or PC) allow transfer of user-generated content to Navionics Freshet Data server for updates; 3.2-megapixel camera has microphone for voice memos; two programmable hard buttons let you customize the device, and touch-screen action eases operation.





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Ratchet Pocket

New Ratchet,  
And Molded  
Ratchet Pocket



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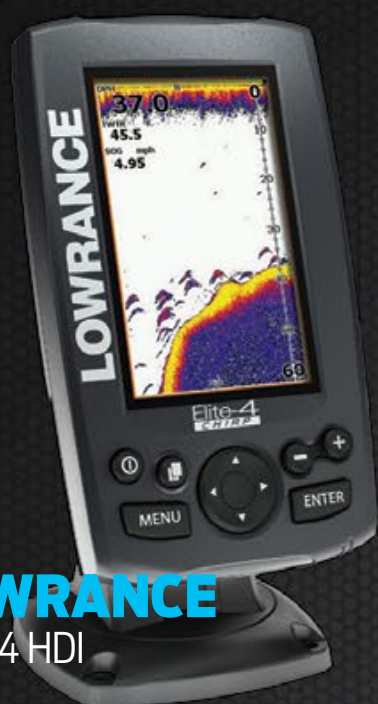


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## LOWRANCE

Elite-4 HDI

\$299

**SCREEN SIZE:** 4.3-inch diagonal

**TOUCH SCREEN:** No

**SONAR CAPABILITY:** Choose 50/200 kHz (to 1,000 feet) or 83/200 kHz (to 3,000 feet) CHIRP with DownScan and overlay for added detail.

**WATERPROOF:** IPX-7

**MEDIA PORT:** MicroSD

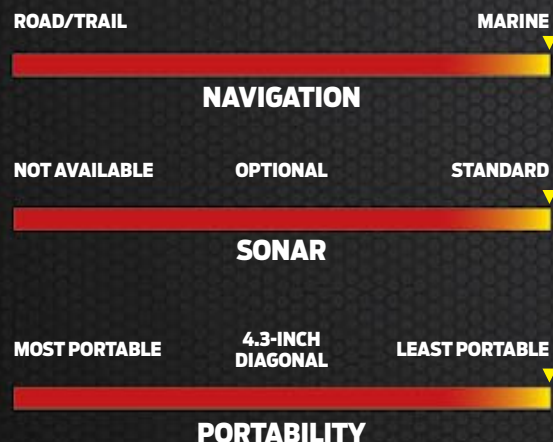
**POWERED BY:** 12-volt power supply

**NAUTICAL CHARTS INCLUDED:** U.S. background map with lakes and coastal contours to 1,000 feet

**OPTIONAL CHARTS AVAILABLE:** Navionics, Jeppesen C-MAP, Fishing Hot Spots

**DASH MOUNTS:** Optional adhesive or screw-down mount

**SPECIAL FEATURES:** Distinguish individual fish from cover; upload recorded sonar tracks to Insight Genesis to generate and download custom contour GPS maps; TrackBack scrolls back to sonar readings, allowing user to create target waypoints.



## IPad with Navionics Boating

FROM \$399

**SCREEN SIZE:** From 7.9-inch diagonal

**TOUCH SCREEN:** Yes

**SONAR CAPABILITY:** Yes, with optional aftermarket Vexilar app and hardware

**WATERPROOF:** Not rated

**MEDIA PORT:** USB and Wi-Fi

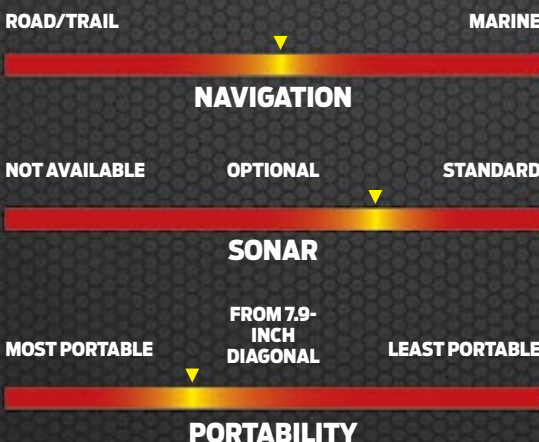
**POWERED BY:** 12-volt power supply

**NAUTICAL CHARTS INCLUDED:** No

**OPTIONAL CHARTS AVAILABLE:** Navionics, BlueChart g2, Jeppesen C-MAP, Fishing Hot Spots, Fugawi apps and maps

**DASH MOUNTS:** Aftermarket mounts and waterproof cases are necessary for secure on-water operation.

**SPECIAL FEATURES:** Aside from the things tablets do (camera, video, media, reader, email, business apps and others), you can add apps like Navionics Boating or BlueChart g2 and then use your iPad to set routes and waypoints and navigate them.



## Vexilar SP200

\$149

Mount your transducer, hard-wire the black box and connect to its Wi-Fi hot spot to add app-based sonar to a smart-phone or tablet. A dual-beam 200/80 kHz transducer reads depths to 240 feet. Even better, it will overlay your sonar trail on the tablet chart in real time, giving you the clearest picture of the bottom, never before available.

Navionics also allows sonar logging via its Freshest Data server. These charts below show an area of the Bahamas both before and after sonar logging updates. The sonar log is rendered and made available to download as an overlay on the chart plotter's resident chart.



Chart before sonar logging added

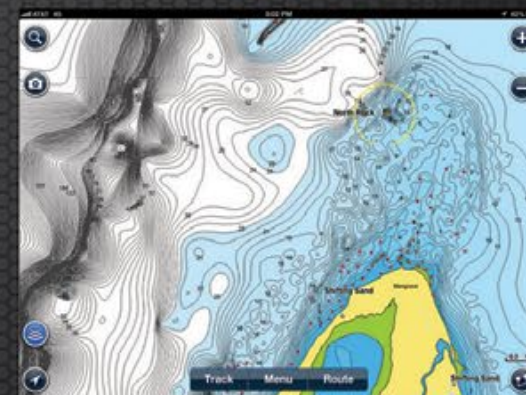


Chart with sonar logging added

PHOTOS: (CLOCKWISE FROM TOP LEFT) COURTESY LOWRANCE, BILL DOSTER (IPAD), ZACH STOVALL, COURTESY VEXILAR (2)



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Item 67501 shown

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Item 91616 shown

LOT NO. 91616  
69087/60379

## \$7.99

REG. PRICE \$19.99

SAVE 60%

**LIMIT 8** - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 7/17/15. Limit one coupon per customer per day.

### SUPER COUPON!

**12" SLIDING COMPOUND  
DOUBLE-BEVEL MITER SAW  
WITH LASER GUIDE**  
CHICAGO ELECTRIC POWER TOOLS

LOT NO. 69684  
61776/61969/61970

Item 69684 shown

## \$134.99

REG. PRICE \$299.99

SAVE \$165

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### WOW SUPER COUPON!

**2.4" COLOR LCD DIGITAL  
INSPECTION CAMERA**  
CENTECH

LOT NO. 67979/61839/62359

Item 67979 shown

## \$69.99

REG. PRICE \$149.99

SAVE \$80

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### WOW SUPER COUPON!

**60", 4 DRAWER  
HARDWOOD WORKBENCH**  
WINDSOR DESIGN

Item 93454 shown

LOT NO. 93454/69054

## \$136.68

REG. PRICE \$249.99

SAVE OVER \$113

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### WOW SUPER COUPON!

**RAPID PUMP® 1.5 TON  
ALUMINUM RACING JACK**  
PITTSBURGH AUTOMOTIVE

LOT NO. 68053/69252  
60569/62160/62496

Item 68053 shown

## \$59.99

REG. PRICE \$119.99

SAVE \$60

3-1/2 Pumps Lifts Most Vehicles Weighs 27 lbs.

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### SUPER COUPON!

**4 PIECE 1" x 15 FT.  
RATCHETING TIE DOWNS**  
HaulMaster

Item 90984 shown

LOT NO. 90984/60405  
61524/62322

## \$7.99

REG. PRICE \$19.99

SAVE 60%

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**WOW SUPER COUPON!**  
**12 VOLT, 10/2/50 AMP BATTERY CHARGER/ENGINE STARTER**  
 Item 60653 shown  
**SAVE 62%**  
**\$2999**  
 REG. PRICE \$4999  
 CEN TECH. LOT NO. 66783/60581 60653/62334  
 11405404  
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**WOW SUPER COUPON!**  
**CENTRAL PNEUMATIC 3" HIGH SPEED AIR CUT-OFF TOOL**  
 LOT NO. 47077/60243 60374/67425/69473  
**SAVE 65%**  
**\$699**  
 REG. PRICE \$19.99  
 Item 47077 shown  
 11417365  
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**WOW SUPER COUPON!**  
**PORTABLE FISH FINDER**  
 LOT NO. 94511  
**SAVE 27%**  
**\$3499**  
 REG. PRICE \$47.99  
 11430356  
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**WOW SUPER COUPON!**  
**1000 lb. Capacity MOVER'S DOLLY**  
**HaulMaster**  
 LOT NO. 93888/60497 61899/62399  
 Item 93888 shown  
**SAVE 40%**  
**\$899**  
 REG. PRICE \$14.99  
 11418190  
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**WOW SUPER COUPON!**  
**2500 LB. ELECTRIC WINCH WITH WIRELESS REMOTE CONTROL**  
**BADLAND**  
 LOT NO. 61846/61258 61297/61840  
**NEW**  
**SAVE \$100**  
**\$4999**  
 REG. PRICE \$8999  
 Item 61840 shown  
 11339851  
 LIMIT 3 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 7/17/15. Limit one coupon per customer per day.

**WOW SUPER COUPON!**  
**MECHANIC'S GLOVES**  
**MEDIUM** LOT NO. 61235  
**LARGE** LOT NO. 93640/60447  
**X-LARGE** LOT NO. 93641/60448  
 Item 93640 shown  
**SAVE 60%**  
**\$399**  
 REG. PRICE \$9.99  
 11353141  
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**WOW SUPER COUPON!**  
**10 FT. x 17 FT. PORTABLE GARAGE**  
**HFT**  
 LOT NO. 69039 60727/62286  
**SAVE \$120**  
**\$17999**  
 REG. PRICE \$299.99  
 Item 69039 shown  
 11368690  
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**WOW SUPER COUPON!**  
**12" RATCHET BAR CLAMP/SPREADER**  
**PITTSBURGH**  
 LOT NO. 46807/68975 69221/69222 62123  
**SAVE 66%**  
**\$199**  
 REG. PRICE \$5.99  
 Item 69222 shown  
 11423713  
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**WOW SUPER COUPON!**  
**600 LB. CAPACITY BOAT TRAILER**  
**HaulMaster**  
 LOT NO. 5002  
**SAVE \$150**  
**\$34999**  
 REG. PRICE \$499.99  
 Item 5002 shown  
 11365247  
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**WOW SUPER COUPON!**  
**12 VOLT MAGNETIC TOWING LIGHT KIT**  
**HaulMaster**  
 LOT NO. 69925 69626/67455 62517  
**SAVE 66%**  
**\$999**  
 REG. PRICE \$29.99  
 Item 67455 shown  
 11429249  
 LIMIT 6 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 7/17/15. Limit one coupon per customer per day.

**WOW SUPER COUPON!**  
**1/2" ELECTRIC IMPACT WRENCH**  
**CHICAGO ELECTRIC POWER TOOLS**  
 LOT NO. 68099/45252 69606/61173  
**SAVE 47%**  
**\$3663**  
 REG. PRICE \$4999  
 Item 68099 shown  
 11437453  
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**WOW SUPER COUPON!**  
**45 WATT SOLAR PANEL KIT**  
**THUNDERBOLT solar**  
 LOT NO. 68751 62443  
**SAVE \$160**  
**\$13999**  
 REG. PRICE \$299.99  
 Item 68751 shown  
 11316789  
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**WOW SUPER COUPON!**  
**PITTSBURGH AUTOMOTIVE 3 TON HEAVY DUTY STEEL JACK STANDS**  
 LOT NO. 38846 69597/61196/62392  
**SAVE 55%**  
**\$1999**  
 REG. PRICE \$44.99  
 Item 38846 shown  
 11400004  
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**WOW SUPER COUPON!**  
**RETRACTABLE AIR HOSE REEL WITH 3/8" x 50 FT. HOSE**  
**CENTRAL PNEUMATIC**  
 LOT NO. 93897 69265/62344  
**SAVE \$90**  
**\$5999**  
 REG. PRICE \$8999  
 Item 93897 shown  
 11417419  
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**PACIFIC HYDROSTAR 12 VOLT MARINE UTILITY PUMP**  
 LOT NO. 9576  
**SAVE 50%**  
**\$2999**  
 REG. PRICE \$59.99  
 Item 9576 shown  
 11429869  
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**WOW SUPER COUPON!**  
**AUTO-DARKENING WELDING HELMET WITH BLUE FLAME DESIGN**  
**CHICAGO ELECTRIC WELDING**  
 LOT NO. 91214/61610  
**SAVE 50%**  
**\$4499**  
 REG. PRICE \$89.99  
 Item 91214 shown  
 11350633  
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**WOW SUPER COUPON!**  
**105 PIECE TOOL KIT**  
**PITTSBURGH**  
 LOT NO. 4030 69323/69380/61591  
**SAVE \$63**  
**\$3699**  
 REG. PRICE \$99.99  
 Item 4030 shown  
 11311952  
 LIMIT 4 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 7/17/15. Limit one coupon per customer per day.

**WOW SUPER COUPON!**  
**18 VOLT CORDLESS 3/8" DRILL/DRIVER WITH KEYLESS CHUCK**  
**drillmaster**  
 LOT NO. 68239/69651  
**SAVE 54%**  
**\$1599**  
 REG. PRICE \$34.99  
 Item 68239 shown  
 11322135  
 LIMIT 5 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 7/17/15. Limit one coupon per customer per day.

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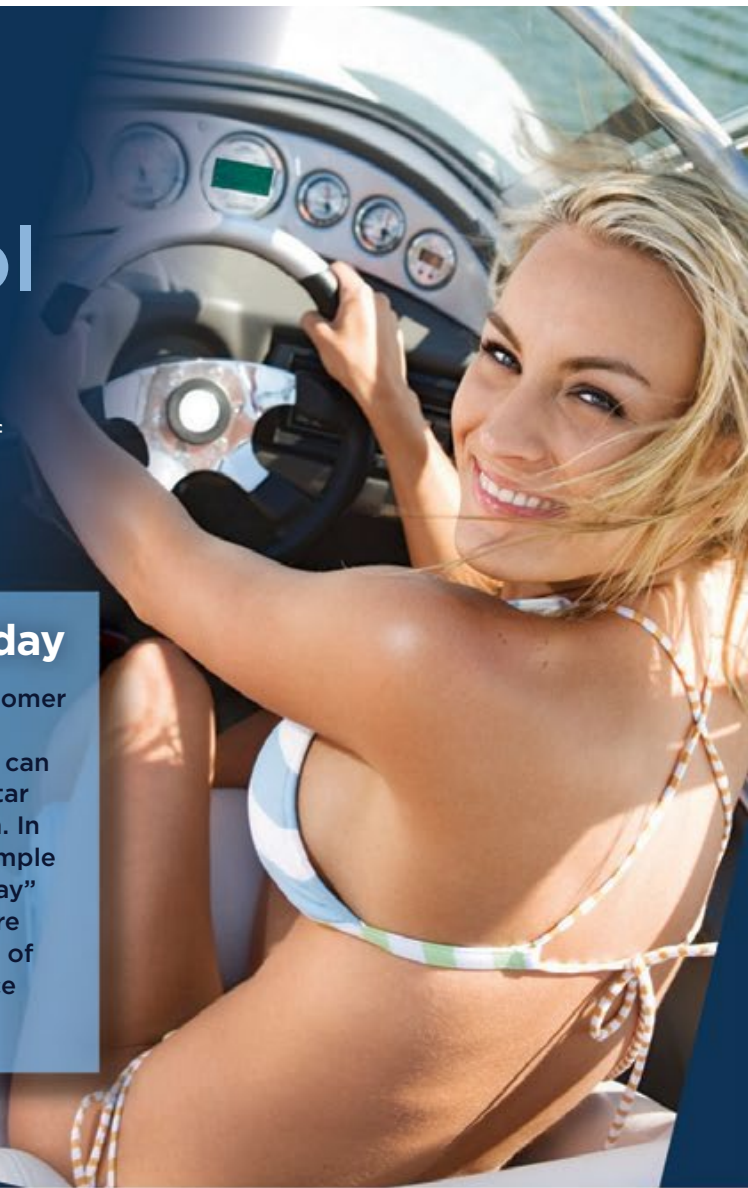
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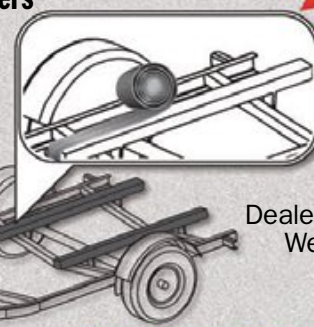
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# Following Seas

By David Seidman



◀ **Don't be timid.** Cut, chop, hack, plumb, wire and reconfigure to make that boat your own.

Cut, chop, hack, plumb, wire and reconfigure. Go ahead: Be like a dog and (metaphorically) whiz in the corners to make that boat your own.

The best place to start is with the electrical system. Mostly because that's what's probably going to give you trouble first, and it's an easy place for a builder to cut corners and not be obvious.

Don't believe me? The suggested standard for minimum voltage drop between the battery and a critical component such as a bilge pump or running light is 3 percent. I'll bet yours is more. Which means you'll need thicker wire. And are all wires supported at least every 1 foot 6 inches, and are the connections secure and waterproof?

I could give you all sorts of guidelines, but it's more instructive to see good wiring for yourself. Look behind the helm console of almost any offshore go-fast. Now look at yours. If you're afraid of sparks, take an American Boat and Yacht Council course (410/956-1050). We audited one and it's great. Or get the book it's based on, *Boating* magazine's *Powerboater's Guide to Electrical Systems*, by Ed Sherman.

Your boat may also benefit from remote battery-recharging posts, a battery selector switch or a better sound system. The idea is to find your inner hacker, and to remember that you won't irrevocably screw things up. Plus, when you've finished, the boat will be yours in a way that no registration card or payment stub can attest to. Just ask your wife.

That's why the next time I see you outside the inlet, I hope you'll have learned to keep your butt connectors sealed, your voltage drop low, and your wing nuts screwed down tight.

## Chop, Cut and Drill

MAKE THAT BOAT YOUR OWN.

**Y**OU DON'T OWN SOMETHING UNTIL YOU CHANGE IT. Women intuitively know this, which is why they nag us and constantly redecorate, and possibly why they're obsessed with buying shoes.

Yet "she who must be obeyed" — the woman who calls me her husband and the most determined female I know — is hard-pressed to make changes to many things in this modern world. It drives her nuts and she's not alone. The things we buy are, in the words of engineers, "fully realized." They are so dense with integrated bits that to mess with one part screws up the whole package. In other words, you're stuck with what you buy.

As a backlash, there is a new underground movement of "hackers": the few, the bold, the ticked off enough to tweak the things they buy to suit their needs, and to fix what's broken rather than throwing it away.

Their manifesto: Void your warranty, violate a user agreement, fry a circuit, blow a fuse, cut your fingers, poke an eye out.

I like it. People have become too afraid to tinker, but they shouldn't be. Take me: I'm not handy at all. Yet I've built a boat that gets 103 mpg and a gun that shoots potatoes, and I can fix almost anything that has a shop manual. I still don't know what I'm doing, but I've found the courage to accept that I'm as likely to improve things as I am to screw them up. Which is no big deal because I'll always be able to find an expert to fix my mistakes. Luckily for us, there is nothing better to start hacking on than a boat.

Boats are relatively primitive structures, made up of easily discernible separate parts. Nothing intimidating here — they beg to be worked on. And if it's a new boat, don't worry; it will probably need some help too. It took my friend Dave one year to get his \$2.5 million Eurocruiser dialed in. It was either that or wait two years for the builder to do it. So don't be timid.



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